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# CALIFORNIA FISH AND GAME

"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

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## AN ATTEMPT TO SAVE CALIFORNIA ELK.

By BARTON WARREN EVERMANN,

Director of the Museum, California Academy of Sciences.

The complete extermination of any species of animal or plant in any part of its habitat is always a matter of regret. Even if the species be a noxious one, we nevertheless dislike to see it entirely wiped out in any locality in which it was naturally found. If it be a useful species, well known to the laity as well as to naturalists, its extermination is deplored; and when the species becomes extinct, when not a single individual is left anywhere upon the face of the earth, it is regarded as most regrettable. The world will never cease to regret the practical extermination of the buffalo. It will never cease to deplore the actual extinction of the great auk and the passenger pigeon. We all now know the fate of those three interesting species; and when we see other species of interesting animals threatened with extermination, we are naturally filled with alarm. We have learned how thoughtless many people are; how disposed they are to destroy things; how strong the inclination is with many to toss a stone at the frog or turtle resting on a rock or log in the pond; to kill every snake they see. "What a fine morning this is! Let's go out and kill something." That spirit is all too prevalent.

Among the important species of California animals now threatened with extinction is the California valley elk (*Cervus nannodes*). This elk originally roamed in great numbers over the great interior valley of California. It was doubtless most abundant in the San Joaquin portion of the Sacramento-San Joaquin Valley, but its range probably included the entire valley and the adjacent foothills. It was certainly abundant as late as 1854. The early records contain many references to its abundance. One of the earliest records is to be found in the manuscript report of the Viscaïno explorations made in 1602. Speaking of the animals in the vicinity of Monterey the statement is made: "Among the animals there are large, fierce bears, and other animals called elks, from which they make elk leather jackets."

Among the most interesting later accounts is that by Mr. Edward Bosqui, the only living charter member of the California Academy of Sciences. In his "Memoirs," to which my attention was called by Mr.

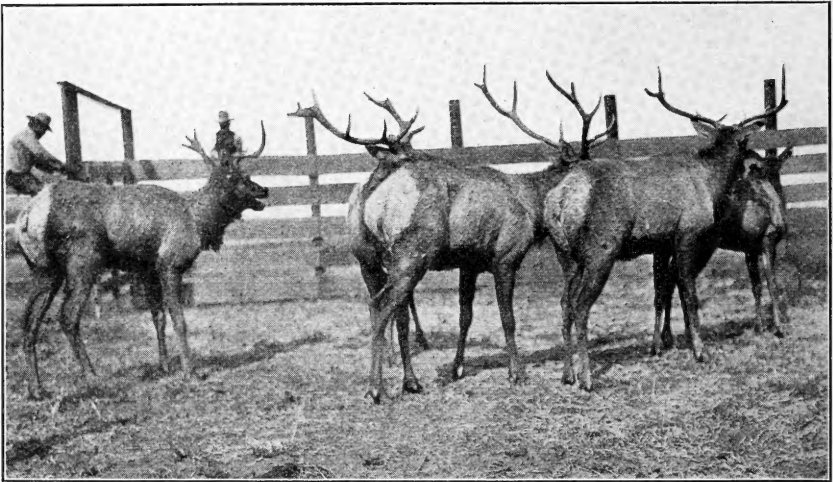


FIG. 19.—California elk, in corral near Buttonwillow, ready for shipment. Photo by John Rowley.

M. Hall McAllister, Mr. Bosqui states that, in December, 1850, while walking from Stockton to Mariposa, he saw, as he approached the foothills, "bands of elk, deer, and antelope in such numbers that they actually darkened the plains for miles, and looked in the distance like great herds of cattle."

On his return from Mariposa to San Francisco in June, 1851, when on Dry Creek some seventy miles from Mariposa, east of the present town of Turlock, Mr. Bosqui states he was one morning "suddenly awakened by the heavy tramp and noise of large animals, and on looking through the fog which prevailed I could see indistinctly, not thirty rods away, giant-like figures of elk passing, so to speak, in procession before me. They were tossing their great antlers about and snuffing excitedly. Suddenly, with one accord and with an impulse that shook the ground like an earthquake, they swept out of sight. It was a procession of phantoms such as one might conceive in a night-



mare, and left an impression on my youthful mind never to be forgotten." (Edward Bosqui, "Memoirs," pp. 62 and 66.)

Speaking of Moraga Valley (in Contra Costa County just back of Oakland) Mr. Bosqui says: "The hillsides were covered with clover and wild oats, and up to 1850 all the country in and about Moraga Valley had been the native haunts of wild game—deer, antelope, bear and elk. Fragments of bleaching elk horns could be found scattered over the valley, and many entire and perfect specimens of the great antlers, although bleached by the sun, I picked up and preserved at the time of our residence there," which was in 1858 and after. (Bosqui, "Memoirs," p. 163.)

In a very interesting book entitled "Death Valley in '49," by William Lewis Manly, to which my attention has been called by Mr. John Rowley, I find a number of interesting references to the California valley elk. In the spring of 1850, Mr. Manly traveled from San Jose

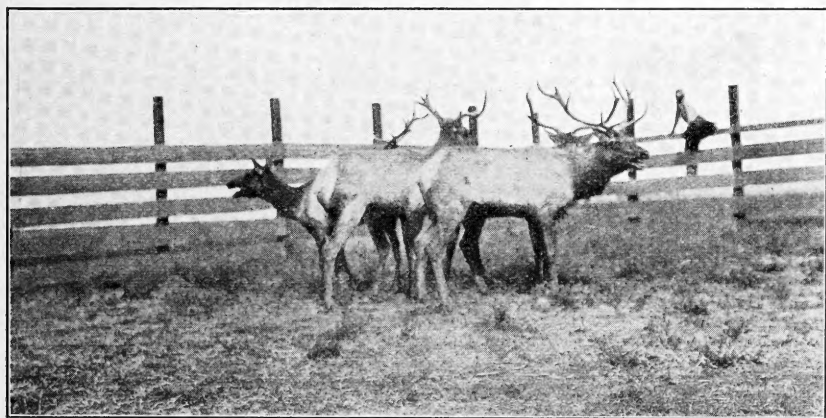


FIG. 20.—Bucks and does, just after entering the small corral. Photo by John Rowley.

into and across the San Joaquin Valley, presumably through Livermore Pass. He says: "The next place was a small house made of willow poles set in the ground and plastered over with mud. This rejoiced in the name of "Mountain House." This wayside inn looked more like a horsethief's glory; only one or two men, a quarter of elk hanging on a pole and no accommodations for man or beast. \* \* \* On the summits of the mountains as we passed through we saw, standing like guards, many large buck elk. It was now fifteen miles to the San Joaquin River, and a level plain lay before us. When our road turned into the river bottom we found the water too deep to get through safely so we concluded to go on and try to find some place where we could cross. On our way droves of antelope could be seen frolicing over the broad plains, while in the distance were herds of elk winding their way from the mountains towards the river for water. When far away their horns were the first things visible, and they much resembled the dry tops of dead pine trees, but a nearer view showed them to us as the proud monarchs of the plains" (page 391). After crossing the San Joaquin just below the mouth of the Merced, they proceeded up the

latter stream, and probably near where Turlock now is, Mr. Manly says: "As we came near groves of willows, big, stately elk would start out and trot off proudly into the open plains to avoid danger. These proud, big-horned monarchs of the plains could be seen in bunches scattered over the broad meadows, as well as an equal amount of antelope. They all seemed to fear us, which was wise on their part, and kept out of rifle shot. As we were not starving as we were once, I did not follow them out on the open plain, for I thought I could get meat when we were more in need" (page 392). On the east side of the valley they camped in a low ravine among low hills where game was plentiful. When they awoke in the morning, "Hundreds of big-horned fellows were in sight but none in rifle shot, and there was no chance for us to get any nearer to them" (page 395).

Inquiries addressed to a number of early residents of the state have elicited additional information of interest and value. Perhaps the most

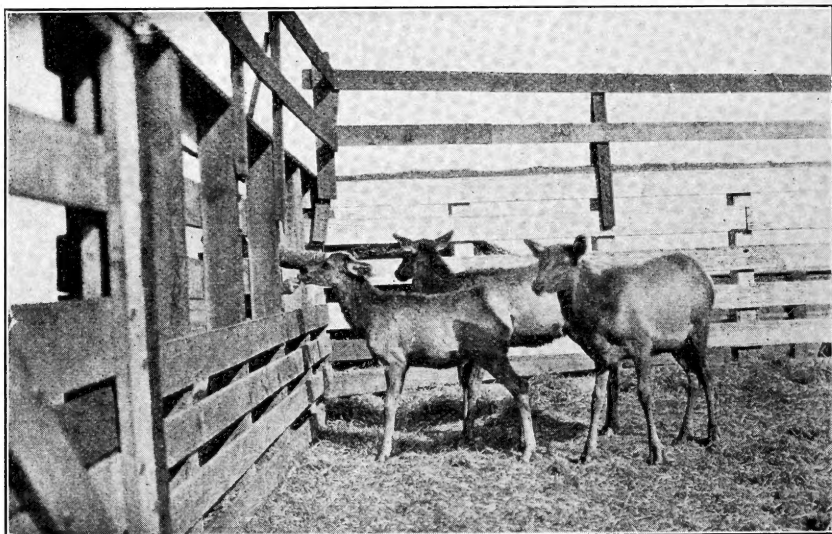


FIG. 21.—Although the elk were very wild when first caught, within a few days they would take feed out of one's hands and permit their heads to be rubbed and their ears pulled. Photo by John Rowley.

interesting letter received is that from Mr. H. C. Banta of Oakland, who writes: "I arrived in the state in 1854, overland from Missouri, locating on the west bank of the San Joaquin River near the present Southern Pacific railroad bridge on the Stockton route. For several years I followed market hunting, geese, ducks, elk, etc. In 1854 I found elk plentiful in the foothills west of the San Joaquin, as well as in the tule swamp. Bob Dikeman and Lee Phillips were my hunting companions, and we practically finished up all the tule elk in that section between Martinez and San Joaquin City. The elk were originally ranging over the hills (along the east slope of the open foothills) as far south as Newman, going north as far as Grand Island. They were originally driven from the hills and valley land into the tules by the vaqueros rounding up wild horses and cattle, as well as by hunters. In

1854 they were nearly all driven to the tules, but the finding of horns of six to eight prongs, all over the hills proved how plentiful they had been.

"I found no difference in size between these elk and the Oregon, Washington, Wyoming, and Colorado elk, and felt sure that the bulls would weigh 700 to 800 pounds. They struck me as weighing about as much as an average steer and their horns were fully as big as any elk I have ever killed or seen in other states. Dikeman shot the last cow and calf about 1863, just west of the Sargent ranch on the North Fork of the San Joaquin near the Mokelumne River. The rest of the animals, so far as I know, ranged in the tules and willows between Buena Vista and Tulare lakes, and only on the south side of Tulare Lake, ranging also west into the foothills. I never heard of any except south of the Sacramento River, and as far south as Buena Vista Lake.

"I killed some antelope on the San Joaquin in 1856, running one well-grown fawn down (6 months old), but both horse and fawn died from effects of the run. The antelope were scarce at this time, and finally drifted around Tulare Lake. I never heard of them coming further west than Byron Springs \* \* \* I killed elk at Tulare Lake in 1856 and found them the same as those that ranged up as far as Martinez. Antelope, tule elk and wild horses were plentiful in the Tulare Lake country and in the vicinity of the present site of Fresno at this time. \* \* \* We hunted in the tules with a sloop, using a ladder lashed to the mast for a lookout. When elk were sighted we would break our way through the tules to them, usually finding them on grass land between sloughs. In one instance in Whisky Slough I cleaned up a band of eight single-handed, keeping out of sight. Five were taken with the rifle and I returned to the boat, loaded my shotgun with heavy charge of buckshot and on returning, found the three remaining yearlings still in the vicinity near the carcasses. Following them, I got all three single file, and, as they turned their heads, I got all three at one shot, at an angle, being kicked over by the charge in the bargain. I never heard of another instance of this kind."

There is some evidence that seems reliable that elk once occurred in Santa Cruz and San Benito counties. Mr. J. W. Miller of Watsonville writes that one of the old settlers of that region, Mr. Frank Mauk, says that when he was a boy his father and oldest brother hunted elk in Santa Cruz County, also in the Salinas Valley. Mr. Boutell, a stage driver in San Benito County, says that elk were plentiful in that county in 1864, their favorite range being section 16, range 11 east.

In a letter recently received from Mr. Mauk he says: "In the early fifties my people lived some six or eight miles from Gilroy at the mouth of Bodfish Cañon. I remember quite well of my father, my brother George, Captain Adams (afterwards sheriff of Santa Clara County), and a Texan ranger named Bob Poore, coming over the mountain to the Pajaro Valley to hunt elk and returning with wagon loaded. At times the trip extended down to the Salinas plains. In 1882 I took charge of the railroad station at Pajaro (now Watsonville Junction). My watchman was a Frenchman named Joe Pillesier, who came to California in 1843 or 1846. He married a daughter of Salvador Vallejo, a brother of General Vallejo. Mr. Pillesier often spoke of the sport he had in killing elk here, saying that on occasions the vaqueroes would

ride among them and the cattle, single one out, ride him down and hamstring him with a machete. Shortly before the General died, he spent an afternoon with me and spoke of the big elk that used to be found here and rather bitterly of the Americans killing them so wastefully."

Professor John Rockwell, who arrived at San Francisco in June, 1850, has stated to Mr. M. Hall McAllister that a few days after his arrival he joined a party of young men who sailed up the bay to found a city to be called "New York of the Pacific." After passing Suisun Bay they entered the mouth of the Sacramento River and landed their supplies on a point of land on the south shore, making their camp in a small arroyo about a quarter of a mile back from the river. About daylight the next morning they were aroused by the rush and tramping

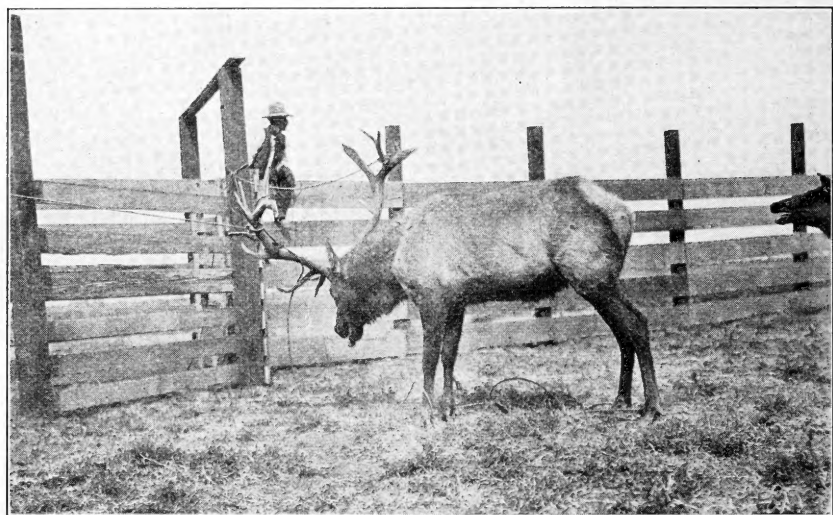


FIG. 22.—Bull elk in corral near Buttonwillow. His antlers will be sawed off, preparatory to shipment. Photo by John Rowley.

of a large herd of animals. Crawling out of their tent they saw the plain around them covered with a great herd of elk. The animals were rushing back and forth seemingly unable to make out their intruders. The party opened fire on the elk, bringing down one or two, when the herd rushed off at great speed toward Monte del Diablo.

Mr. Payne J. Shafter of Olema, Marin County, has given the following information to Mr. McAllister regarding elk in that county. He says: "Don Juan Garcia (the old keeper of the Country Club) told me that in about 1850 a Spanish priest with a band of Indians went over on Point Reyes and drove a herd of about seventy-five elk on to a peninsula in Limantour Bay. The priest had them nearly all killed for their hides and tallow—bulls, cows, and calves, the last elk of Marin County." Mr. Shafter further says that when he first came to Marin County, in 1862, many antlers in good condition were gathered on Point Reyes and kept as souvenirs. Also that Frank Miller, an old hunter and trapper, told him that, in 1852, he with another hunter named Bell had seen over a hundred elk swim across Tomales Bay and go north

toward Mendocino County. This story is corroborated by Jack Briones, a keeper of the Point Reyes Club, who recently told Mr. McAllister that his father had told him the same story. Point Reyes seems to have been a favorite resort for elk.

Captain MacKenzie, who was for many years captain of the steamer San Rafael, running to San Quentin Point, and later to Sausalito, informed Mr. McAllister that in the early days, probably in 1850, he made a trip in a small sloop to the mouth of Petaluma Creek, and while exploring the marshes in that vicinity he came upon a great herd of elk.



FIG. 23.—It was necessary to saw off the antlers of the big bucks to keep them from injuring each other in the pens and cars. Photo by John Rowley.

They were in great numbers. Several were killed before the herd made off, rushing headlong over everything like a herd of stampeded horses or cattle.

Mr. McAllister has obtained some valuable data from Jim Paine, the old Suisun Marsh hunter, who, with his partner, Seth Beckwith, in the seventies and eighties, furnished the San Francisco market with the finest and most toothsome canvasbacks. Paine claims that he killed the last tule elk ever seen on the Suisun marsh. It was, he thinks, in the fall of 1868. He was sculling up the Cordelia Slough after a day's shooting, when, near what is now Teal station, he saw a large cow elk plunge into the slough just ahead. Sculling alongside, he killed the animal with a heavy load of duck shot.

Mr. Chas. A. Allen, the veteran naturalist and collector of Nicasio and San Geronimo, Marin County, has given us the benefit of his experience. He has collected in Marin County for forty-two years. In his earlier years he found elk antlers very plentiful about Point Reyes from Bolinas north to the mouth of Tomales Bay. The elk



seemed to inhabit a strip of territory some five or six miles wide. They appeared to have limited their range to the open lands along the coast. Forty-two years ago all the ranch buildings had elk horns nailed up on the barn or other buildings. Evidently the elk had entirely disappeared from Marin County before 1872, the year of Mr. Allen's arrival there.

Whether the Marin County elk were of the same species as the San Joaquin Valley elk is not certainly known. It may be that the elk of the heavily forested, humid region along the coast from Marin County northward is a distinct species. The facts can be determined only by comparison of material from the two regions. But whatever may be the facts as regards this matter, it is clear that elk were very abun-

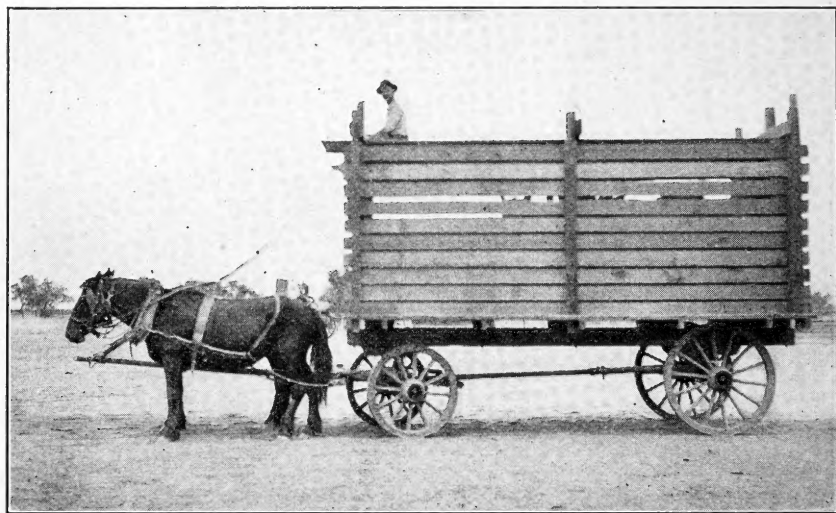


FIG. 24.—The crate used in transferring the elk from the corral to the railroad cattle-pens. Photo by John Rowley.

dant in the San Joaquin Valley and adjacent foothills, certainly as late as 1850 to 1854. From that time they decreased rapidly. In the early seventies it is said the herd had been reduced to a few individuals—one report says to a single pair—and they were on the Kern County ranch of Messrs. Miller and Lux. It is said that the imminent extinction of the species came to the attention of Mr. Henry Miller of the Miller & Lux Company, and he immediately gave strict orders to all the employees of the company that the elk must not be disturbed under any circumstances, and that everything possible for their protection should be done.

That has been the policy of Messrs. Miller and Lux to this day. The animals were protected. The herd increased. In 1914 it was estimated to contain about four hundred animals. The state game law makes the killing of any elk a felony, punishable by imprisonment for a term not exceeding two years. Although the elk roam at will over the Miller & Lux ranch, doing—the company estimates—from \$5,000 to \$10,000 worth of damage every year to the alfalfa and Egyptian corn fields and to the fences, they have not been disturbed. That the species was not

exterminated is due, without doubt, to the intelligent interest taken in its preservation by Mr. Henry Miller. It must be admitted, however, that Messrs. Miller and Lux are willing, in view of the very considerable loss the elk are causing them each year, to have the herd reduced somewhat by moving some of the animals to suitable reservations in other parts of the state.

With this object in view, on the sixth of last April, Mr. LeRoy Nichel, on behalf of Miller & Lux, offered to turn over to the California Academy of Sciences all or such portion of the herd of California elk now roaming over their Kern County ranch as they might be able to catch, provided the Academy would undertake to distribute them to various federal, state, and private reservations in the State of California.



FIG. 25.—At Monterey the elk were transferred from the car to large crates, in which they were hauled to the Del Monte Park, where they were liberated October 30. Photo by F. C. Swain.

In 1905 a few elk were taken from this herd and placed in the Sequoia National Park, where they have done fairly well. These and the original Kern County herd are the only elk of this species in existence.

The development of the oil fields and the expansion of agricultural operations in the Kern County region have brought many dangers to the elk herd in that locality. To aid in saving the species from possible extermination it was proposed to place a few elk in each of the various reservations and parks in the state in the hope that they might thrive there and become the nuclei of new herds.

This was the hope of Messrs. Miller and Lux. One of the conditions of their offer was that the animals should be put only in places affording a favorable environment and where they would probably breed.

The offer of Miller & Lux was accepted by the Academy, and plans were made for carrying out the undertaking.

On April 25 and 26, in company with Mr. M. Hall McAllister, through whom Messrs. Miller and Lux made the offer to the Academy, I visited the Kern County ranch for the purpose of consultation with the superintendent as to the best time and method for catching and shipping the animals and regarding all preliminary details. At that time a visit was made to the alfalfa fields in which the elk feed and to the sagebrush plains to which they retire during the day or when disturbed, and about 100 of the animals were seen.

After giving the matter careful consideration it was decided to undertake the catching and shipping of the elk in October. Early in that month Messrs. Miller and Lux constructed a corral one fourth of a mile long and one eighth of a mile wide in an alfalfa field into which the elk were observed to come every night to feed. A wing one fourth of a mile long was run out from each corner of the end toward the foothills. Woven fence wire was put upon the wings at once, but only the posts for the corral proper were placed at that time. After the elk had come down into the field several nights and gotten used to the posts, heavy woven fence wire was placed on the two sides and the rear end of the corral, and the following night about 150 elk came into the corral; then the wire was placed on the posts at the entrance and the animals were trapped. (See figs. 19 and 20.)

The wire fence was very strong and at least eight feet high; nevertheless, some broke through or jumped over it. A good many people came out in automobiles and otherwise to see the elk, and so frightened them that about 100 broke out the first afternoon. Those that remained became quite tame in a few days. (See fig. 21.) Various, diverse and unexpected difficulties came up every day and it was not possible to predict what success would be attained in the undertaking. The animals might break through the corral or jump over the fence and escape; they might escape when being loaded into the crates for hauling to the railroad cattle pens; or escape from the cattle pens; or refuse to eat; or run amuck and kill or injure themselves; or die in the cars while in transit to the parks; any one of a score of things might happen to cause failure.

However, it is gratifying to know that, in spite of all difficulties and uncertainties, Messrs. Miller and Lux succeeded in capturing and placing in the cars for shipment a total of fifty-four elk. These were disposed of as follows:

1. To a thousand acre private reservation of Mr. J. M. Danziger, Los Angeles, six elk.

This reservation is in the Santa Monica Mountains, near Los Angeles. The environment, it is believed, will prove very favorable.

2. To a six hundred acre private reservation of Mr. E. L. Doheny, Los Angeles, ten elk.

This reservation also is in the Santa Monica Mountains, only a short distance from the Danziger ranch, and is under elk-proof fence.

3. To a seven hundred acre park of Mr. S. C. Evans, Riverside, four elk.

This park adjoins the city limits of Riverside and furnishes ideal conditions.

4. To the San Diego City Park, twelve elk.

The conditions here are not entirely as favorable as one would desire, but it is believed the elk will do well. This park was regarded as a favorable location in which to try the experiment of keeping the elk in relatively small enclosures.

5. To the Modesto City Park, two elk.

6. To the California Redwood Park Association, ten elk.

This association is the governing body for the Big Basin reservation.



FIG. 26.—After leaving the crates in Del Monte Park, the elk ran 200 to 300 feet, stopped, went a little farther to a small creek, then crossed to the other side and began feeding. Photo by F. C. Swain.

which comprises some 55,000 acres. It is believed the conditions obtaining there will prove favorable.

7. To the Del Monte Park, ten elk.

These elk were turned loose in the large reservation of the Pacific Improvement Company near Monterey. (See figs. 25 and 26.) The environment, it is believed, will prove favorable.

Recent reports received from the various parties to whom the elk were sent state that the animals are doing well in all cases.

The Academy has orders, which it has not yet been able to fill, for about 100 additional head. An effort will be made to fill these orders next year.

It should be stated that all matters pertaining to the capture and delivery of the elk on board the cars were in the hands of Messrs. Miller and Lux. (See fig. 24.) The actual shipping of the animals was attended to by Mr. A. L. Bolton, assistant curator of mammals, who

performed the rather trying duties with good judgment, skill and entire success. Not an animal was lost or injured after being placed in the cars and all reached their respective destination apparently in excellent condition. (See figs. 25 and 26.) Mr. John Rowley, curator, department of mammals, and Mr. Herring, taxidermist, were on hand at Buttonwillow during the entire time, and saved for the museum of the California Academy of Sciences all the animals that got killed or fatally injured. On the whole, the experiment of distributing the elk to various parts of the state is regarded as having been a success, and it is believed it will do much toward the conservation of this interesting species of big game.

### **CALIFORNIA'S FUR-BEARING MAMMALS.**

By HAROLD C. BRYANT,

Game Expert, California Fish and Game Commission.

The fur-bearing mammals of California have decreased rapidly in the last twenty years and there are, as a result, only a relatively few men who are professional trappers. Once a state which supplied thousands of valuable furs each year, California now counts for but little in the fur markets of the world. And yet even now, with but a remnant left, the sale of furs brings into this state each year a sum not less than \$250,000. At the present rate of decrease, however, there is little hope that this sum can long continue to pour into our coffers, even though the price of raw furs continues to rise.

California possesses practically all of the best fur-bearing species of animals. Look over the list: Gray squirrel, beaver, Pribilof fur seal, mountain lion, lynx, coyote, gray fox, red fox, ring-tailed cat, raccoon, black bear, weasel, river otter, sea otter, badger, skunk, wolverine, fisher, and mink.

Already two of the best of the fur-bearers, the sea otter and beaver, have had to be totally protected in order to save them. The grizzly bear is entirely extinct within the state, and the Guadalupe fur seal very nearly so. The beaver of our mountain districts has been entirely exterminated and there are but a few hundred survivors to be found along the Sacramento, Colorado, and San Joaquin rivers.

Although once exceedingly numerous along the coast, the sea otter is now nearing extinction. Two or three were killed just before the law protecting them went into effect in 1913, but few have been reported as having been seen since that time. Bidwell, in Rogers' "History of Colusa County," states that when the county was first settled it was not uncommon to see thirty or forty grizzly bears in one day. There has not been an instance of the killing of a real grizzly in California for the last four years. Apparently "Monarch" was the last surviving member of the species. He died in Golden Gate Park, San Francisco, about three years ago.

The slow decrease of the fur trade has been noted by nearly everybody and yet no attention has been paid to the possibility of conserving the fur bearers as a natural resource to be administered like other natural resources of the state. The chances of being able to do this



grow less with each year, and it is high time that an investigation be instituted so that facts and figures can be at hand to support the legislation necessary.

A search in the early history of California reveals the fact that this state for many years took a very prominent part in the world's fur trade. Companies were formed and ships outfitted on purpose to develop the fur resources. Trade centered in the skins of the sea otter, an animal which furnishes the finest fur known, fur which at the present time sells for fabulous sums. The average price paid in London in 1910 was \$1,703.33.

From 1786 to 1790 trade in sea otter skins in California was controlled by the Spanish government and was in the hands exclusively of the padres and Indians. In an old manuscript written by the comandante at Santa Barbara to the governor, dated November 9, 1789, the following numbers of sea otter skins were reported shipped: From Purissima, 74; Santa Barbara, 79; San Buenaventura, 81; besides 32 fox skins. This represented shipments from the southern coast regions only. In 1790 the government monopoly ceased and the padres were deprived of a market. They welcomed therefore the opportunity to trade afforded by American ships at the beginning of the nineteenth century. From 1800 to 1812 a number of American ships annually visited the coast, trading cloth, muskets, and other materials for sea otter skins.

Sturgis (MS) gives the following figures regarding the number of ships in the fur trade in the northwest, the number of sea otter skins and the price brought in the Canton market:

Year—	No. of ships.	No. sea otters.	Sale price.
1799-----	7	11,000	\$25
1800-----	6	9,800	22
1801-----	10	13,000	21
1802-----	8	14,000	20

Even as early as 1785 the capture of sea otters had become of such importance that on October 24, 1785, regulations for the collection of skins were issued by Governor Fages of California. The order was sent to Ignacio Vallejo at San Jose commanding that "anyone who goes out to trade with the Indians for otter skins" shall be punished. The price at the time was \$1.00 to \$7.00 (Bancroft, 1885 *a*, pp. 439-440).

In 1786 La Pérouse, a Frenchman, making a special investigation in Monterey was told that 20,000 skins could be furnished each year, and many more by establishing new posts north of San Francisco. He makes the statement that before this year otter skins were worth "no more than two rabbit skins," and that the Spaniards did not suspect their real value. (Bancroft, 1885 *a*, p. 438.)

In 1801, which was perhaps the most flourishing period of the trade, there were sixteen ships on the coast, fifteen of which were American and one English. Upwards of 18,000 sea otter skins were collected for the China market in that year by the American vessels alone. (Bancroft, 1884 *a*, p. 373.) In 1802 "more than 15,000 sea otter skins were collected and carried to Canton."

The first battle of San Diego was precipitated by the trade in otter skins. Bancroft (1885 *a*, pp. 10-12) gives the following account of the affair:

"Several American trading craft made their appearance on the California coast this year (1798), creating not a little excitement in some instances by attempts at smuggling, in the success of which the people were often hardly less interested than the Yankee captains. The *Lelia Byrd* was fitted out at Hamburg by Captain Richard J. Cleveland of Salem, Massachusetts, who had just made a fortune by a four years' voyage or series of commercial adventures in the Pacific, during which he had touched the northern coast of America, but not of California, in partnership with William Shaler, and sailed in November, 1801. Shaler was master and Cleveland second in command. The vessel was loaded with a great quantity of merchandise, which it was hoped to sell profitably on the west coast of America, no matter how, when, or where. \* \* \* They succeeded (1802) not only in selling goods to the amount of \$10,000, and obtaining what supplies they needed, but also bought 1,600 otter skins just arrived from California at prices which assured the success of the trip.

"Sailing from San Blas, January 25, 1803, after careening and 'boot-topping' the vessel at the Tres Marias, our adventurers sailed in February for San Diego, where they were given to understand there was a lot of otter skins that might be obtained advantageously. \* \* \* On the evening of March 17th, the *Lelia Byrd* passed the fort at Point Guisjarros without being hailed, and anchored in San Diego harbor. Next day Commandante Rodriguez with an escort of twelve men came on board to comply with the formalities required by superior instructions. \* \* \* He took a memorandum of the provisions which the visitors pretended to need and promised to supply them the next day. At the same time he indicated the necessity under law of an immediate departure, and returned to shore, leaving Sergeant Joaquin Arce with five men as a guard, and giving the Americans permission to land without visiting the presidio. \* \* \* From Arce it was learned that Rodriguez had about a thousand skins, several hundred of which he had confiscated recently from the *Alexander*, Captain Brown. Shaler made every effort to buy the skins, but in vain, because, as Cleveland puts it, 'Rodriguez dared not indulge his desire of selling them to us.' A visit was made to the shore, including an inspection of the battery at the point.

"On March 21st Rodriguez came on board, received his pay for supplies, and took his leave after wishing the visitors a pleasant voyage. Preparations were completed for departure in great disappointment, but it was determined to make a final attempt to obtain the skins. It was known that the soldiers had small quantities which they would gladly dispose of if they could do so without detection. Two boats were accordingly sent under cover of the night to different parts of the bay shore. One returned with a few otter skins, but the other was seized by the watchful commandante, the mate and two men being bound and left on the beach under a guard of three men. Next morning Cleveland went ashore with four men, each armed with a brace of pistols, rescued the captives and brought them off. Sails were set at once and the somewhat hazardous attempt was made of running out past the guns of the fort. The hoisting of a flag and the firing of a blank cartridge from the battery had no effect, and when a nine-pound ball came across her bow the *Lelia* still kept on her course, with the Spanish

soldiers forced to occupy the most exposed and conspicuous positions. As she passed the fort two broadsides from her six three-pounders were discharged." Neither the fort nor the ship were seriously injured. The most interesting and regrettable part of the whole story is that the one thousand otter skins, which the commandante would not sell, finally rotted and were thrown into the sea.

There are said to have been weeks in 1812 in which the Russians established at Bodega killed seven or eight hundred otters in the bay of San Francisco alone. The skins at that time were worth at Kiakta or Mainakin on the borders of Persia and China, to which they were sent, from eighty to a hundred dollars each, so that the profits of early Russian adventurers in California were enormous (Hittell, 1885 *a*, p. 626). The total number of sea otter skins definitely recorded as having been taken by the Russian company in California is 13,000. This probably does not accurately record the total number taken. In San Diego, between 1840 and 1845, a skin was worth about a price equal to that of four or five bullock hides. Sea otters in those days were commonly found feeding along the kelp beds and they were shot with rifles from boats.

Vallejo (MS. 1, pp. 105-6) says the otter were so abundant in 1812 that they were killed by boatmen with their oars in passing through the seaweed; and the Russians killed 15,000 a year for five years, and 5,000 a year down to 1831. This account is probably grossly exaggerated (Bancroft, 1885 *b*, p. 430).

Another account, written in 1816, states 2,000 a year were caught. By this time decrease was noticeable, for Bancroft (1885 *a*, p. 420) says: "The Indians still caught now and then an unfortunate, slow-motioned sea otter that came in their way and the padres shipped the small store of skins, or sold them whenever they found a chance. The Russians took a constantly and rapidly decreasing number of otters each year, a number which was greatly exaggerated in the ideas of the Spaniards."

Hittell (Bancroft, 1884 *a*, p. 373) states that the number of sea otter skins taken on the coast annually after 1880 was 5,500, worth in San Francisco \$440,000, or \$80 each.

There was also established an important trade in fur seals. Captain Wm. Smith went to the Farallones in 1808 with a party of Kadiaks, stayed there two years, and caught 130,000 seals, besides many otter. He took them to China on the *Albatross* and obtained \$2.50 for seal-skins and \$30 or \$40 for otter. (Bancroft, 1885 *b*, pp. 95-96.)

Hittell (1885, p. 285) states that the Russians collected as many as 80,000 seal skins at the Farallones in a single season.

In 1810-11 the *Albatross*, one of the vessels engaged in the fur trade, touched at the Santa Barbara Islands, where were found few seals but many sea otters. During the same years, according to the log of the captain's clerk, W. A. Gale, this ship took from the Farallones 73,402 fur seals. In addition they took from the coast 248 beaver, 21 raccoon, 6-wildcat, 153 land otter, 4 badger, 5 fox, 58 mink, 8 gray squirrel, 1 skunk, 11 muskrat, and 137 mole skins. Sea otter skins to the amount of 639 and 631 otter tails were also taken. The estimated value of this catch at Canton prices was \$157,397.

From 1812 to 1840 the Russians kept up an establishment at the Farallones as well as at Ross. The chief object was to secure fur seals, 1,200 or 1,500 skins being taken annually for five or six years.

After 1818 seals diminished rapidly until only 200 or 300 per year could be caught and the business was no longer profitable. About 200 sea lions were killed at the same time, the skins and sinews being used in making boats. No fur seals were taken on the Farallones after 1834. (Baneroff, 1885 *b*, p. 633.)

Soon after the year 1825 trappers began making their appearance in the great valleys of California. In 1826 "Jedidiah Smith crossed the Mojave Desert to San Gabriel Mission and trapped the length of the San Joaquin Valley. Repeating the daring adventure in 1828 he was forced by suspicious authorities to leave the country. \* \* \* Smith's heavy catch of furs revealed to Dr. McLoughlin the rich possibilities of the Sacramento and San Joaquin valleys and opened the way for the exploration of the district by the Hudson's Bay Company. In the autumn of 1828, McLeod was sent south along Smith's trail for that season's hunt. He trapped the mountain streams with excellent success and was returning to Fort Vancouver with pack horses loaded with beaver and land otter skins when he was caught in the ascent of Pitt River by an unexpected fall of snow and obliged to cache his furs and hurry on in order to save his men and animals. McLeod was severely censured for this misfortune, and the following year the California district was intrusted to McKay. He ventured even to the Bay of San Francisco and took 4,000 beaver along its reedy shores, but the fur was inferior in quality to that of the mountain beaver and brought only \$2 a pound. The next season Peter Skeene Ogdon was transferred to this field, and under his energetic management the Great Valley was thoroughly explored and developed. For ten years (1829-1838) a Hudson's Bay Company brigade made its annual traverse, south in the autumn and north in the spring, between Fort Vancouver and French Camp—the post on the San Joaquin. The cavalcade was a picturesque one, formed in Indian file and led by the chief trader. Next him rode his wife, a native woman, astride—as is common with the females—upon her pony, quite picturesquely clad. \* \* \* Next the clerk and his wife, much in the same manner; and so on to the officers of less importance, and the men; and finally the boys, driving the pack horses, with bales of fur, one hundred and eighty pounds to each animal. The trampling of the fast-walking horses, the silvery tinkling of the small bells, rich handsome dresses, and fine appearance of the riders, whose number amounted to sixty or seventy, made a really patriarchal array. (White, *Ten Years in Oregon*.)"

"American trappers were not slow to avail themselves of the new hunting grounds revealed by Smith, Pattie, and Walker, and year by year larger parties appeared in the Great Valley. They no longer attempted to pack their furs over the mountains, but sold them to traders at the coast ports, and the traffic grew to considerable proportion, from \$15,000 to \$20,000 a year. [In 1841, according to Wilkes, the export of beaver was two thousand skins at \$2 each; sea otter, five hundred skins at \$30 each; elk and deer, three thousand skins at from 50 cents to \$1 apiece.] Every trapping party was required to have

a license, and the fees brought in a tidy revenue, highly gratifying to the officials." (Coman, 1912, pp. 208, 210, 211, 214, 216.)

John A. Sutter, a German-Swiss trapper, built an adobe fort three miles above the junction of the American River with the Sacramento, and organized a considerable fighting force. He had the governor's commission to defend the frontier against gentiles and horse thieves. His first business venture was in the fur trade, for beaver were still abundant up the Fork. However, he soon had an opportunity to buy at a bargain agricultural implements, seeds, plants, and draft animals from Bodega, and was thus enabled to develop his estate and to give up trapping as a livelihood.

The Hudson's Bay Company continued operations in the San Joaquin and Sacramento valleys until 1841 or later. Headquarters were at Yerba Buena (San Francisco). Trapping stations were established at French Camp in San Joaquin County and at French Camp in Yolo County.

Writing in 1840, Lanman calls attention to the declining fur trade in the following words: "But the fur trade appears fated to decline upon the eastern as well as the western portion of the Rocky Mountains by the diminution of the animals from which it seeks its profits. This diminution has been obviated in some measure by the Hudson's Bay Company, who have preserved these particular tracts undisturbed. But where those precautions are not used the American or British trader advances to the territory and strips it of its wealth, so that in a short time there will be but little left upon the soil for commercial enterprise."

Beaver and otter were reported as becoming scarce on the Sacramento River as early as 1837.

By 1885 the fur trade had so declined that Hittell (1885 *b*, p. 564) states: "The days of fur hunting, which once was a great business in California, are gone, and it can not be long until wild fur-bearing animals will be curiosities in the country." Since that date a steady decrease has been noted and his prediction is almost fulfilled.

Having now shown the fur trade as it existed in the past in California, let us now look for a moment at the fur trade of the world today, that we may better appreciate the money value of fur-bearing mammals. The immensity of the fur trade is best shown by the following quotation taken from a report by J. Walter Jones to the Commission of Conservation of Canada (pp. 73-83): "The volume of the fur trade is simply amazing to one who has not studied the question. We have figures of Brass of Berlin, who has been in the business for many years and who for thirty-five years has been collecting fur statistics. He estimates the total production of the world as 360,000,000 marks, or \$100,000,000. I have been assured that America alone spends \$100,000,000 a year on manufactured furs at retail prices. The whole world pays, roughly speaking, for manufactured furs at retail prices about \$350,000,000 annually. In Australia the value of pelts is about \$6,000,000, while Africa and South America produce pelts worth about \$2,000,000 a year. Warm countries, of course, do not produce furs. For Persian lamb—the product of the karakul sheep—America pays wholesale approximately \$14,000,000. In America the pelts as sold in our houses—not the prices the trader gets, but the prices after they.



come to the wholesale house—amounted to \$24,000,000 a year. Asia and Europe each pay about a similar amount.

"In America a greater number of muskrat skins are obtained than of any other fur-bearer, except the rabbit, several million skins going to the market yearly. Of other American animals we might mention the skunk, about one and a half million skins of which are sold yearly; the opossum, about a million; the mink, about six hundred thousand; the raccoon, six hundred thousand; otter, about two hundred thousand; marten, one hundred and twenty thousand; lynx, ninety thousand; beaver, eighty thousand, and fisher, ten thousand."

It can be estimated from figures given by Ernest Thompson Seton in his "Life Histories of Northern Animals" that the revenue to North America for the last seventy-five years, from the sale of the

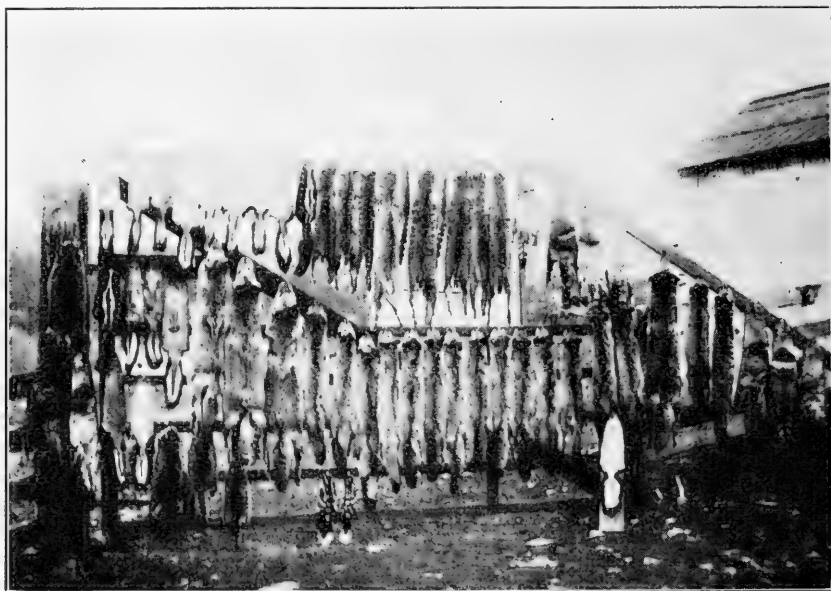


FIG. 27.—A trapper's valuable catch of furs in the Sierras. This was the catch at one location only. Photograph by Geo. Williamson, Jr.

skins of the commoner fur-bearing mammals, has been \$222,735,000, and to the United States \$113,950,000. This means that there has been an average annual income to North America of about three million dollars and to the United States of \$1,500,000. The average annual fur production of North America in recent years is estimated at \$24,000,000. The sale of skunk skins, alone, brings in an income to the trappers of the United States of about \$3,000,000 annually.

According to a St. Louis fur importer, approximately twenty-five million fur-bearing mammals were caught in North America last season. These pelts had a cash value of about twenty million dollars.

The total North American catch of last year (1914) has been approximated as follows: Muskrats, 15,000,000; opossums, 2,800,000; raccoons, 2,400,000; skunks, 2,152,000; minks, 630,000; civet cats, 500,000. Vari-

ous other kinds, including foxes, wolves, otters, beavers, fishers, wild-cats, lynx, bear, white weasel, martens, wolverines, and mountain lions, amounted to 1,500,000 skins.

Hence it must be seen that in its fur-bearing mammals the United States has an extremely valuable asset, and one which, when the income is estimated, ranks ahead of some of the other natural resources. California formerly ranked high as a fur-producing state. (See figs. 27 and 28.)

The skins of fur-bearing mammals have, since earliest history, furnished men with clothing. In fact, so important were they in the early history of North America that they formed not only a medium of exchange among the Indians, but also among the early settlers.

As far as money value is concerned, furs furnish the most valuable of all the products to be derived from wild animals. At the present time, although furs have ceased to be a necessity and have become a luxury, yet the demand for them is steadily increasing. Furs have become scarce not only because less are produced, but also because more are demanded.

A number of factors have been instrumental in increasing the demand. Population has greatly increased and the relative number of people in sufficiently good circumstances to be able to purchase furs has also increased. The added interest in fashionable dressing to be seen in our cities and the growing use of the automobile, with its luxurious fittings and need of warm clothing, have also been instrumental in increasing the use of furs.

This increased demand for furs has rapidly depleted our supply. Hunters and trappers have penetrated the most secluded haunts of the fur-bearers and a decrease is to be noted everywhere. Nor has the hunter and trapper been the sole agent in the decrease, for the advance of civilization has cleared away the forests, drained the swamps, and continually destroyed the natural homes of fur-bearing animals. The London sale of furs by C. M. Lampson & Company shows that all of the more valuable furs have decreased in numbers from 20 to 95 per cent. Along with this decrease of the numbers of pelts of the more valuable fur-bearers has come an immense increase in the numbers of pelts of the commoner mammals, such as the muskrat, skunk, and lynx. In the offering at the London sales of January, 1914, more pelts of every species except the mink and the civet were offered than were offered in 1913. The increase in the price of pelts during the last twenty years has averaged about 25 per cent for the staple fur-bearers of Canada.

There are two important ways in which we can meet this steady decrease among the fur-bearers. First of all, we can encourage the breeding of fur-bearers in captivity; and, second, we can pass laws which will protect them in the wild during the summer season when their fur is not prime, or we can entirely close the season, thus reducing the number taken each year. By the use of both methods can we alone hope to supply the present demand for furs.

Those who have attempted in recent years to domesticate fur-bearing mammals have found that it is a profitable industry. Already fur farming has progressed beyond the theoretical and experimental stage in Canada and the eastern United States.

It was not until success was obtained in breeding the silver and other color phases of the fox that fur farming was undertaken along extensive lines. Of course, as the price of furs has steadily increased the incentive to rear fur-bearers in captivity has been augmented. The pioneer fox breeders have acquired wealth in their business and have, therefore, inspired in others the desire to enter the same business. As a result of the demand for breeding stock, the price of animals has increased to such an extent that it is beyond the means of the average man. Consequently corporations and partnerships involving a capitalization of as high as ten million dollars, have been formed for farming the silver fox. The industry has even spread to Russia, where the sable and several species of fox are now extensively farmed.

The success of fox farming has also brought about the attempt to breed in captivity some of the less valuable fur-bearers, such as the mink, raccoon, and skunk. Of late years the value of skunk fur has steadily increased until now the sale of that fur brings into the United States about three million dollars each year. The numbers sold in London jumped from 426,610 in 1899 to over 2,000,000 in 1911. Prime skins at the present time bring from \$1.50 to \$3.50. It is believed that the prices will increase rather than decrease.

The 1915 price list from Funston Brothers & Company, a large fur house in St. Louis, shows that the prices paid for the more valuable furs have been greatly reduced. The prices paid for black and silver fox skins were \$800 to \$1,000 in 1914, but are only \$400 to \$600 in 1915. The prices for mink, fisher, marten and coyote skins have been reduced about one half. This marked reduction is attributed to the war and will, no doubt, be for a limited time only. When the war is over and the European markets again open there will doubtless follow just as sudden an increase in prices.

There seems to be little danger that the fur-farming industry will fail to be a permanent one. Not only is fur farming an attractive and interesting occupation but it will continue to be remunerative. In spite of the past year, when the period of financial stringency would naturally react most seriously on such a luxury as furs, the price of furs has increased instead of decreased. This has been also in spite of the fact that, in 1913, two or three firms in Leipsic, Germany, failed and threw upon the market at reduced prices \$4,000,000 worth of furs. Mr. J. Walter Jones, who has carefully investigated the fur-farming industry in Canada, reports that there are not more than 1,600 silver foxes in captivity in the world. Probably the world's yearly production of real silver fox skins does not exceed five thousand. Fur dealers maintain that silver fox skins will never sell for less than \$100 each, and since the rate of increase of silver foxes in captivity is only about one hundred per cent yearly, it appears that at least the farming of foxes will continue to be profitable. Another reason why fur farming will doubtless continue to be profitable is because a better grade of fur is obtained. Ranch bred stock are animals improved by domestication, and being killed carefully and at exactly the right time, the fur is prime and the skins are never torn or injured.

The United States Biological Survey is now carrying on experiments in breeding fur-bearers. Two stations are maintained, one at Prichard, Idaho, and the other at the National Zoological Park, in Washington,

D. C. Those interested will be able to profit by the results of these experiments.

We have long had laws to protect our fish and game but the fur-bearers have been entirely neglected. Meanwhile they are disappearing so fast that the danger point has been reached. Attention to this resource is highly necessary at this time, both because of economic reasons and because there is danger of its passing beyond our control through its entire extinction. The fur-bearing mammals can be made to pay a large dividend if the capital stock of breeding animals is increased.

In most of the provinces of Canada, and in many of the eastern states, all of the more important fur-bearing mammals are protected during the summer season, when their fur is of practically no value.



FIG. 28.—Skins of fur-bearers obtained on a hunt with dogs near Martin's Ferry, Humboldt County.

The open season is usually limited to five months—November 1st to April 1st. In many places a license has to be procured before fur-bearers can be trapped. In Canada the demand for live animals for breeding purposes has become so great that laws have been passed prohibiting the hunting of fur-bearing animals during the breeding season.

Each state as it has attempted to protect the fur-bearers has been confronted with difficulty, for many of the fur-bearing mammals are predatory and their depredations on domesticated animals and birds are in many cases serious. In most instances trouble has been avoided by providing that animals found destroying poultry and live stock could be killed. In many cases where depredations are reported the rancher himself is to blame for not better protecting his poultry and farm animals and as people come to a knowledge of the value of fur-bearers as a national resource there will be more interest in their preservation.

In eastern states the protection afforded fur-bearing mammals appears to be effectual and adequate. In many places where beavers

have been protected for a number of years an increase is to be noted. California should investigate the success obtained in other states and should profit by their experience.

A state trapper's license is very desirable for two reasons: First, it eliminates the man who traps for the fun of it, and who is not interested in preserving the furs; and, second, it furnishes information as to the number of trappers and the amount of trapping done. The latter is particularly important in furnishing data on which to base further protective legislation.

In the beginning of this paper a glimpse of the early fur trade in California was given so as to afford a comparison with conditions at the present time which are fairly well known by everyone. There followed statements which showed the extent of the world's fur trade, and then, possible methods which could be employed to develop the fur industry in California by conserving the fur-bearers. In conclusion, the urgent necessity for early attention to the problem of conserving the fur-bearers should be emphasized. Now is the time to better conditions, not after it is too late. It has taken millions of years to produce the animals which we have now and yet we sweep them out of existence in a hundred years, or less. Man is able to create great industries which become a resource to a country, but where is the man or the group of men that can create a resource that compares in the slightest degree to any of the great natural resources? Man-made creations are capable of restoration but an extinct form of life can never be restored. In this ethical viewpoint we perhaps find the strongest argument of all. But add to this the economic viewpoint and we have an argument in favor of wild life conservation that defies every assailant. Will the people of California heed the handwriting on the wall and properly discharge their duty to the wild life itself, to their state, and to humanity?

### Summary.

A casual investigation has shown that there has been a large decrease in the number of fur-bearing mammals in California. This decrease becomes very apparent on comparing the present status of these animals with that of the past. In the early history of California there is much which relates to the abundance and great money value of the fur-bearers. History shows that several companies were formed and many expeditions undertaken in order to develop the fur trade. From 1800 to 1812 a number of American ships annually visited the California coast, trading cloth, muskets, and other material for skins. The toll taken of such valuable fur-bearers as the fur seal, sea otter, and beaver led to their practical extermination. The fur trade in this state began to decline about 1820, but the Hudson's Bay Company kept up their trade until about 1840. Since that time the procuring of fur has been limited to trappers in the mountain districts. The time has now come when several of the fur-bearers need absolute protection; others need to be protected during the breeding season, and still others during the time when their fur is of no value.

We have long had laws to protect our fish and game but the fur-bearers have been entirely neglected. Meanwhile they are disappearing so fast that the danger point is reached. Attention to this resource is highly necessary at this time, both because of economic reasons and



because there is danger of its passing beyond our control through its entire extermination. Two methods of conserving the fur-bearers are possible and practicable. Several species can be conserved by rearing them on fur farms, thus allowing a monetary harvest to be reaped. The remnant which is left in the wild can be made to hold its own and to increase by giving the mammals proper protection by law. Both of these methods are being employed with success in other parts of the United States. California must fall in line and protect fur-bearing mammals if she desires to conserve this asset to the state and make it a source of income and a heritage to pass on to future generations.

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**WARDENS AND WARDEN WORK.\***

By T. S. PALMER.

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It is a pleasure to me to meet the wardens. While it is some years since I have been in Vermont, I feel that I am not entirely a stranger to this state, or its conditions.

During the past three months I have had an opportunity to meet and compare something like 500 wardens, or would-be wardens in different parts of the United States, and I believe that I have examined orally not less than 200 men who were already in state service, or who aspired to such positions. It occurred to me that it might interest you to know what is required of wardens in different parts of the country, and also what is being done to raise the standard of warden work, in the various parts of the United States.

So far as I am aware there are no foreign countries, with possibly a few exceptions, that have any officers like our wardens. Canada has officers usually known as game guardians or game protectors, whose duties are somewhat similar; Australia has officers known as rangers, who look after her game; and in some British colonies of South Africa there are officers whose duties correspond somewhat with those of wardens in the various states. Neither in England, nor in Scotland, so far as I can learn, are there any such officers, and the work of looking after the game falls largely on the employees of private estates, the game-keepers. In Germany the work devolves very largely upon forestry officers, who besides being wardens are required to do regular forestry work. Somewhat the same conditions prevail in Hungary and in Austria.

The warden service in the United States is very largely an institution peculiar to this country, and it behooves us not only to know what is being done, but to keep in touch with the advances made in this work. Not long ago, in one of the examinations, in the middle west, I asked one of the candidates what was his idea of a warden. (This man was not yet in the service, but hoped to be.) He replied, "I know what a warden is. He's a man that wears diamonds in his shirt front and draws his salary!" In some sections of the country this has probably been true of wardens. In some states a warden's position has been looked upon as a last resort. A man who was out of a job, or was unable to get work, or who had failed in different callings, could always get an appointment as a warden. Naturally the pay for such work was not always satisfactory, to the state, to the people, or, in many cases, to the wardens themselves.

In order that we may meet on common ground, let me say that I distinguish very carefully between warden work as a job and warden work as a profession. If you are serving the state of Vermont merely for the pay, and have no other motive, you had better quit at once, both for your own sakes and for the sake of the state. But if you are in the service of the state to protect its game, to assist in the management of the great natural resources of the state for the benefit of the

\*Address delivered at the Second Annual Convention of the Sportsmen of Vermont, March 4 and 5, 1914.

public, and for the benefit of coming generations, then certainly you are worthy of your hire and are engaged in a noble profession.

Not many years ago there was no provision for the payment of wardens in any of the states. They were supposed to secure what recompense they could from a portion of the fines for violation against the game laws. The "moiety system," so called, has never been a success in any of the states where it has been tried—it was merely a first step. Then provision was made for paying salaries at so much per day or per month, but these salaries were small. A warden was not supposed to be worth as much as a common laborer. Salaries of \$30 or \$50 a month were regarded as ample for the arduous duty of protecting the game and risking a man's life in enforcing the laws. Later on, more onerous duties were imposed, more was expected of the wardens, and in some cases fairly respectable salaries were provided. Today, speaking generally, wardens' salaries range from \$60 a month, or \$2.00 a day (fortunately very few states pay as little as that but usually at least \$75.00 a month, or \$2.50 a day), up to \$125 a month or \$1,500 a year.

Among the things which we are looking forward to, to make warden work a profession and not a job, are:

1. Stability of compensation so that a man can count on receiving a regular salary.

2. A living wage.

3. Reasonable opportunity for promotion, when a man has attained increased efficiency and experience; and,

4. Retirement on a reduced salary (as in Massachusetts), when a man has served the state for a number of years.

Stability of compensation is important to obtain good service. A man can not be expected to work one day for the state and the next day for a private employer, and give good service to both. Neither can a warden be expected to give good service to the state for a less wage than a man receives for digging a ditch in the street. Warden work, under modern standards, requires a high degree of intelligence and a good many qualities which can not be had for nothing. Even with these things we can not get the best results if a man has nothing to look forward to after ten years' service except a number of enemies, the enmity of his neighbors and the possibility of being shot while in discharge of his duty.

Let me tell you in a few words what some states are doing to secure the best results in warden service. In the first place, to get the best men, five states have what is known as a "civil service" law. This is nothing more than the application of the merit system to appointments for warden work. A civil service law does not make good wardens, it simply sifts out the fit from the unfit. New York was the first state to apply the merit system to the game warden service by the ordinary test of a written examination as a prerequisite to appointment.

Wisconsin went a step farther and required not only a written examination, but an oral examination and certain physical tests. Every candidate for the position of warden reads the game law and if he has a retentive memory and is reasonably bright he can easily learn the various open and closed seasons, etc., but he may have had no experience in the field and may know nothing about the application of the law.

An oral examination brings out these facts. A warden may tell you about trapping, how to handle a gun, or how to handle a boat, but take him out in the woods or on the water and you will soon see whether he is repeating something he has learned or whether he has had actual experience. Consequently in some states the physical test is considered very important.

Recently the medical test has been added also. In New Jersey this test is severe because warden work in that state is hard and rather dangerous, and as there are many applicants there is no reason why any man should be appointed who is not absolutely sound physically. Wardens are required to undergo the same tests for strength and endurance as applicants for the positions of firemen and policemen, and then to take some tests especially applicable to the warden service.

Without going into too much detail let me describe the examination for deputy wardens held in Illinois last December. Sixty positions were to be filled, and the salary, \$100 a month and expenses, was evidently attractive, for there were 359 applicants, or an average of six candidates for each place. The examinations were held in the armory at the state capital, Springfield. The candidates were required (1) to give brief statements of their experience, (2) to tell something of their education, and (3) to answer ten questions on the game law and warden's duties. While some were writing out answers to questions, others were formed in line around the room, and were examined as to their physical condition. The services of seven physicians were required for this part of the examination. Stepping up to the first physician each candidate was measured and weighed; a few steps beyond he found another physician who sounded his heart and lungs; a little farther on another who tested his eyesight and hearing, and so on. After the men had finished their written and medical examinations they were taken upstairs to the state museum and passed in line in front of a series of cases in which were arranged thirty or thirty-five mounted specimens of common birds, fish and game. They were given one minute in front of each case to identify at sight the fish or birds which they were required to protect. They were then given an oral interview separately of three to ten minutes as to their general knowledge of conditions in the state, the protection of game, and warden's duties. The examination lasted from 9 in the morning until 10 at night—not continuously for each man, but it required thirteen hours to handle the whole number of candidates.

The next day some of the men were taken out into the field and examined in handling a gun, in running a motor, and in various other outdoor tests. On the basis of this examination appointments were made to the sixty positions, and under the civil service law of Illinois only the highest man can be certified for a position. As the examination was required both of wardens already in the service who were holding temporary positions and those outside the service who wanted to be wardens, it was necessary for a warden who wished to hold his position not only to take the test, but to stand at the head of the list.

Two months later, in February, a second examination was held for the position of district warden, corresponding somewhat to that of county warden in Vermont. The chief duty of the district warden is to supervise the work of the local deputies and his salary is \$1,500 a year. There were six positions to be filled, and sixty-six candidates, or

eleven applicants for each position. The examination was much the same as that for the deputies, except that it was much more severe. Among the questions asked were questions of policy, regarding the handling of men, how to distribute wardens to secure the best enforcement of the law, how to work out certain problems in different parts of the state, etc. These Illinois examinations were the largest of the kind ever held in this country for the purpose of selecting men to serve as wardens.

Three weeks ago it was my privilege to attend the warden's school in Wisconsin, which lasted three days. Wisconsin has gone a step farther than some of the states in providing promotion for men who perform their work satisfactorily and pass a suitable examination. The first step is to grade the men. Those who enter the service as protective wardens receive \$2.50 a day, or \$75 a month; those who elect to enter the service for what is called "outlying fishing" work, which consists of looking after the commercial fisheries on Lake Superior and Lake Michigan, get \$3 a day, or \$90 a month; and those who wish to enter transportation work, inspecting the shipment of game or fish, also receive \$3 a day, or \$90 a month.

Last summer the state warden inaugurated a correspondence school for wardens. On the first of each month he sent each of his men five questions which the deputies were requested to look over and answer to the best of their ability. Failure to return the answers counted on the record. The warden then sent out copies of the correct answers and each deputy was asked to compare them with his own. The fifth month the state warden invited the deputies to submit five questions which they would like to ask relative to the game laws. Instead of attempting to answer them, he brought this collection of several hundred questions to the annual convention and had the men discuss them, and in this way thoroughly covered the ground by a general consideration of the more practical questions which arise in the state.

Each year the state assembles the deputies and holds a promotion examination, open to those who have been in the service more than six months. Each man with a satisfactory efficiency record, who attains the requisite marks on the examination is entitled to a liberal promotion. Every man is anxious to secure a promotion and every member is on hand, ready to do his best. A man's record for the year counts 50; the written examination counts 30; and the oral interview counts 20 per cent. The efficiency record does not depend upon the number of arrests made but is divided into five parts, of which the number of arrests and convictions is only one, and in some cases a very small part. A good deal of prominence is given to the success of a deputy in building up sentiment in his community in favor of fish and game conservation, for the law of Wisconsin requires the warden to instruct the public as to the protection of fish and game. Another thing that counts is prompt and efficient service, and still another is promptness and care in making out reports.

The men that brought in the largest number of arrests were subjected to very careful scrutiny in the oral examination, and it soon developed that this was a very uncertain basis for promotion. Many men, thinking that the number of arrests was the test that counted, had evidently been looking for all sorts of minor offenses, many of them doubtful

cases and none of them particularly difficult. Others had given all their attention to minor fishing cases (although the only support for the warden service was derived from the receipts from hunting licenses) and a few had given attention to difficult cases, such as dynamiting fish, or detecting illegal shipments of fish or game. As a result the number of arrests, in many cases, proved disappointing to the men themselves, because they found that quality rather than quantity of work counted in making up the record.

On the basis of the promotion examination every deputy in Wisconsin who passes successfully may receive an increase of fifty cents per day, which will amount to nearly \$200 a year and he may be promoted from \$900, the lowest salary, as high as \$1,400 a year.

New York also has a system of promotion, but the increase in salary is \$100 a year. The examination is not open to the entire department, but only to those men who have attained a certain grade in their efficiency record during the year.

The civil service conditions that have been mentioned are required by law in six states—New York, New Jersey, Wisconsin, Illinois, and recently in California and Massachusetts. They have been adopted as the policy of the game commission in Delaware and are likely to be introduced as the policy of the commission in Michigan and Kentucky. When Delaware passed a hunting license law and received a fund sufficient to pay regular salaries to wardens, the game commission insisted that a written examination was first to be held for the position of chief warden. As soon as the chief warden had been appointed he was instructed to confer with the department of agriculture and prepare an examination made up of written, oral and outdoor tests suitable for deputies. When the appointment of the deputies had been made the commission secured the services of two experienced game protectors from another state to work for a few weeks with the new men so that Delaware has had good service from the very first and has secured some very surprising results.

So much for the methods of selecting wardens. Massachusetts, as already stated, has gone a step farther and has provided that its officers, including wardens, who have served for fifteen years, may retire on a certain percentage of their salary. In other words, the state treats its wardens as some large railroads and other business concerns treat their employees. The time may come when other states will follow this example, but at present Massachusetts is the only one that has taken this decisive step.

Turning for a moment from the warden to his superior, let us see how conditions have changed in recent years. Not many years ago the state warden, or commissioner, in one of the western states was called in by the governor, who was about to prepare his message to the legislature, and was notified that unless he could find some way of making his department self-supporting the governor would be obliged to recommend the abolishment of fish and game warden work. The warden submitted a plan for a hunting license system, which was adopted at the next session of the legislature, and from that day to this the service in that state has been self-supporting. The game department is now self-supporting in about half of the forty-four states that have game commissions—chiefly through the income from hunting licenses.

Recently Prof. T. S. Adams, of the tax commission of Wisconsin, in a public address on taxation, declared: "The game warden department of Wisconsin is paying dividends to the state." That department is not supported by ordinary appropriations; it has never cost the taxpayers of the state a dollar for the protection of game, and last year, after paying all expenses, it had a surplus of about \$60,000. A commissioner who can handle his department and make it a revenue producer for the state is entitled to reasonable compensation. So it has come about that while a few years ago \$1,000 was considered a reasonable salary for a commissioner, considerably larger salaries are now paid in some states. In New York \$10,000 is paid to each of the three members of the conservation commission; several states pay from \$3,000 to \$5,000, and a majority of them now pay \$2,000 or more. In some states the warden is not only a police officer, whose chief duty is to enforce the game laws, but he must be skilled in game propagation, just as he is supposed in some states to be skilled in fish propagation; and he may be required also to assist in forestry work, if necessary; to aid in fire warden work, or to take part in educational work.

Let me digress a moment to speak of some of the duties of federal wardens who are called on to do a variety of things. We have some wardens who are in charge of the national bird reserves (of which there are now sixty-four) to see that the birds are not molested during the breeding season. We have wardens whose duty it is to take care of big game, especially buffalo and elk, on some of the game preserves of the west; and we have wardens whose duty it is to feed the elk. In Wyoming we feed sometimes as many as 7,000 elk, feeding each winter from 500 to 700 tons of hay. It is also the duty of some of the wardens to accompany and care for the shipments of elk made to different states for the purpose of establishing new herds. Finally, we have men cooperating with state officers in the protection of migratory birds and in the enforcement of the laws regulating interstate commerce in game.

The warden of today must be an all around state officer, familiar with his territory, familiar with the habits and haunts of the various kinds of birds, game and fish under his protection, and familiar with the people in the community. He must be in touch with conditions elsewhere, must keep informed as to new inventions for hunting, improvements in firearms; new devices for outwitting the game laws, and novel plans for game conservation, so that when called upon to express an opinion as to what is necessary to meet certain conditions, he may at least know what is being done in other states in the enforcement of the fish and game laws. New problems are rising fast, but unless a warden is familiar with them he is not earning his salary. To meet this difficulty some of the states, like Vermont, have established annual conventions for the purpose of bringing the wardens together to compare notes, to get acquainted with each other and to learn what is being done in this and other states in the various lines of conservation work.

I have gone over these points hurriedly to call attention to the steady progress in the administrative part of warden work; to let you know that progress is being made in recognizing the value of warden service through fair salaries, and the hope of still better salaries through pro-



motion. The one thing I want to impress on you is, that in order to succeed, a warden must regard his work as a profession, must realize that it demands unremitting attention and study, and that it is essential for him to keep fully abreast of the times.

## THE TENNESSEE POSSUM HAS ARRIVED IN CALIFORNIA.

By JOSEPH GRINNELL.

Contribution from the Museum of Vertebrate Zoology, University of California.

On February 25, 1914, there were received at the Museum of Vertebrate Zoology of the University of California two live possums (*Didelphis virginiana* of scientific parlance) (see fig 29). These were kept alive at the museum a few days and then killed and preserved as scientific specimens, these now bearing the museum numbers 20799 and 20800.

The circumstance of particular interest was that the animals were captured wild here in California, where possums were never known to have been native. They were secured and sent to us by Deputy Fish



FIG. 29.—A Tennessee possum caught near San Jose in February, 1914. This animal is becoming well established in Santa Clara County, where several escaped from captivity about four years ago.

and Game Commissioner I. L. Koppel, of San Jose. The exact locality of capture was on the Wade Ranch on the banks of the Guadalupe Creek, near Agnew, Santa Clara County, where they were taken February 5 and 23, 1914.

At our request, Mr. Koppel has made extensive inquiries in regard to the occurrence of possums in the vicinity of San Jose. According to Mr. Koppel's findings there have been at least two cases of importation and liberation, both "about four years ago." Mr. J. R. Kocher, a jeweler in San Jose, residing at Tenth and San Antonio streets, imported seven from Jackson County, Tennessee. Two of these got away at his residence; the other five he sent to a negro caterer in San Jose, by the name of Jake Overton. These were kept in a coop at 856

South Eighth street, San Jose, until three "got out," making five that got away out of this one shipment.

Another party is reported to have more recently had shipped to him another lot of possums, about three of which are rumored to have gotten loose. At any rate, we are safe in assuming that the initial introduction took place early in the year 1910.

Up to the end of 1913 possums to the number of fully 100 have been reported as captured, thus many more than can be accounted for as liberated. Ten, at least, of these have been caught in San Jose alone. Others have been found in various parts of Santa Clara County from Sunnyvale to Wrights and Gilroy. On Guadalupe and Coyote creeks tracks have been seen of families of a dozen each. A male was caught down along the creek at Wrights Station. About January 20th three were caught with dogs along the creek at the same place. About March, 1913, at the Standard Oil Company's plant at San Jose, near Los Gatos Creek, a large female was killed, with eight young in her pouch. The young were raised on milk. A male was caught later in the same locality.

Of the two possums sent to the museum, the large male was found on a stump the day before it was shipped. The female was caught in a brush pile previously.

About September 1, 1914, Manuel Silva, on the McClay Ranch, near Evergreen, caught a female that had seven young, about the size of gophers in her pouch. On the S. F. Patton Ranch, on the Mt. Hamilton road, a possum was poisoned recently, and dogs caught another one near by.

Information received on September 23, 1914, is to the effect that on the Wade Ranch, on the Alviso road near Agnew, a female possum was captured by Mr. Wade and given to Mr. Farry of Agnew, where some twelve days later she became the mother of ten beautiful young, two of which, at the present time, are sojourning at the state game farm.

On October 5, 1914, on the George Fiehman Ranch near Milpitas, a fox terrier caught two possums about one fourth grown; and on October 8, 1914, the dog caught three more about one half grown, showing that at least two litters were represented. These five possums, together with two procured from Mr. Farry of Agnew, were sent by Mr. Koppel to Superintendent W. N. Dirks, at the state game farm at Hayward. On October 20, 1914, Mr. Koppel caught a large male possum on the George Fiehman place and shipped it at once to the game farm. This possum was as large as Fiehman's dog. All together, at least nineteen have been caught on the Fiehman ranch.

It is reported by Mr. Koppel that five of the possums got away at the game farm on October 13th.

It is believed that fully two hundred possums are accounted for to the present date as killed or captured, and in spite of this, the species appears to be spreading and multiplying at a rapid rate.

It would appear that the possum has found in this part of California congenial climatic conditions, at least sufficiently near those of its native habitat in the southeastern United States so that it is thriving. It is rather doubtful if we are to consider ourselves lucky in having acquired this addition to our mammal fauna. In fact, it is quite possible that we may live to greatly regret the circumstances which secured its introduction into our state.

The following account abbreviated from Rhoads (1903) will give a vivid idea of what we may expect of the animal:

The possum spends the day in hollow trees, logs, deserted burrows of other animals, drains, sewers, brush piles, hay stacks, and outbuildings. It prowls abroad at night, foraging for fruit, nuts, eggs, birds, and rodents, reptiles and insects. When other food is scarce it eats carrion, and may even become a cannibal. It lives and multiplies in thickly settled regions, this doubtless because of its omnivorous diet, its fecundity, its habit of "playing possum," and its nocturnal habits.

The birth rate of the possum is marvelous. As many as sixteen young are produced at a time; at birth they are three fourths of an inch long, naked, and with rudimentary hind limbs. Each youngster is securely attached to a teat within the abdominal pouch of the mother. From this pouch they emerge when about the size of small rats, and cling by tail and feet to the body of the parent. There are said to be as many as three litters per year.

The fondness of the possum for fruit, eggs and poultry can scarcely be offset by the facts that some people consider it good to eat and that it is somewhat of a scavenger and destroyer of vermin. Its over-abundance, however, may be checked by trapping, and it is not likely that the possum will spread far beyond the thickly settled parts of the state where it can find a living around orchards, gardens and barns.

It will be extremely interesting to watch the history of this, our latest immigrant.—*Museum of Vertebrate Zoology, University of California, Berkeley, October 26, 1914.*

## THE HALIBUT FISHERY OF THE PACIFIC COAST.\*

By EDWARD P. RANKIN,

General Assistant, Scientific Department, U. S. S. Albatross.

The purpose of this paper is to present a brief description of the gear and the methods used by halibut fishermen; in it are set forth a few observations, made throughout the halibut investigation, which was conducted off the coast of Oregon by the United States Bureau of Fisheries, during part of April, May, June, July, August and September, 1914. The work was carried on, part of the time from the fisheries steamer *Albatross*, on which expert fishermen were employed; and part of the time from Newport, Oregon; consequently, the methods have been viewed from all sides. The information here given regarding the fisheries is the result, both of actual fishing operations in which the writer took part, and of interviews with skippers and fishermen of various halibut boats.

*Hippoglossus hippoglossus*, the common halibut, is a member of the flounder family, and one of the most valuable of food fishes; its body is extremely flattened from side to side, oval in outline, almost white on the lower side, and dark gray or grayish-brown on the upper side. In this connection, it must be remembered that this fish swims on its side; in consequence, its back and its belly are in the same horizontal plane. This is all due to the distortion of the head, because of which both eyes are situated on the same side, the "blind" side being the lower. The very young halibut has the appearance normal to other

\*Printed with permission of U. S. Bureau of Fisheries.

fishes, and swims on its belly; but soon the skull becomes so twisted, as to bring the two eyes on the same side—usually the right; from that time on, the fish assumes the horizontal position. The mouth, armed with strong teeth, is small in proportion to the size of the body as compared with most other fishes, but it is proportionally large in comparison with other flounders.

In point of size, the halibut is one of the largest fishes, ranking with the swordfish, the tarpon and the tuna. Specimens weighing four hundred pounds, or more, have been taken, but they are not commonly seen; Jordan and Evermann, in "American Food and Game Fishes" (1905, p. 524), mention that "Nilsson records one from the coast of Sweden that weighed 720 pounds." A fish weighing between eighty and one hundred pounds measures nearly five feet in length; its "depth," *i. e.*, the distance from back to belly, is about one third of its length. A fish that has attained a weight of three hundred pounds is about seven feet long, and perhaps three feet deep.

It has not yet been learned when spawning occurs, nor is it known under what conditions this takes place. On September 1, 1914, in a female halibut caught on the *Albatross*' gear, the eggs were looser, somewhat larger, and seemingly more nearly approaching "ripeness" than was the case in any female halibut previously taken during the investigation. Apparently, the time for spawning was approaching, but the evidence is too slight to form the basis for any theory.

Concerning the food of the halibut, little is known, for the reason that eight or nine tenths of those caught are found to have disgorged the stomach contents. Some evidence, bearing on this question, was obtained as a small result of the investigation. Strictly carnivorous, the fish has a varied diet, sometimes exhibiting positively cannibalistic tendencies. In the stomach of one halibut was found a starfish; another contained a small octopus; while from still a third one, a young ray was removed; crustaceans, such as shrimps, are also indulged in at times. But fishes, of various kinds and sizes, seem to constitute the bulk of the halibut's food. A small halibut, partly digested, was found in a larger one; and in each of several halibut were the bony remains of fish which must have been somewhat of a "mouthful" for the captor. One halibut, in particular, weighing about 130 pounds, contained, all at the same time, a hake (*Merluccius productus*), a silver salmon (*Oncorhynchus kisutch*), and a red rock-fish (*Sebastes ruberrimus*), the so-called "rock-cod." Each of these fish weighed fully ten pounds, and had been swallowed only a short time before the halibut was caught.

Distinctly an inhabitant of the bottom of the sea, the halibut roams leisurely about, but probably does not remain long in one locality. This is inferred from what fishermen report: that, after they have fished one place for perhaps a day, they are obliged to shift to another location five or ten miles away, because the fish have disappeared from the old ground. Bottom of coarse sand or fine gravel, on which sea-pens and anemones abound, seems to be preferred by the fish, while muddy or barren bottom is either shunned or passed over rapidly. In addition to the character of the bottom and the abundance of food, *temperature* is a factor influencing the wanderings of the halibut; rarely is the fish found in waters warmer than 45° Fahrenheit, but is most commonly taken in waters considerably colder.

Ranging from Behring straits southward as far as the latitude of San Francisco, halibut are, however, found in commercial quantities only from the latitude of central Oregon northward. By far the greatest amount of halibut is taken in the waters of southeastern Alaska; yet not inconsiderable quantities occur in the region of Cape Flattery, Washington, and off Newport, Oregon. Fairly successful fishing is done off Smith river, in the northern part of California.

The boats engaged in the halibut fishery vary greatly in size, from small ones having a cargo capacity of 50,000 pounds to large ones capable of holding 200,000 pounds of halibut. Each boat—unless it is a very small one indeed—carries from two to twelve dories (flat-bottomed rowboats of special design), from which the fishing is done. Among fishermen, the number of dories carried by a boat is used as an indication of her size; thus, "She carries four dories," or "She carries twelve dories." This phrase indicates, also, how many fishermen are employed on a boat, for each dory is manned by two fishermen.

The gear used in fishing for halibut consists of lines, set with hooks, which are allowed to lie on the ocean bottom. These are called the "ground line." Each line is about 225 feet in length; seven or eight of them, fastened end-to-end, constitute a "skate" of gear, which has a total length of nearly 1,600 feet—almost one third of a mile. To the ground line are fastened, or "bent," short lines, called "gangings" or "gangions," at intervals of about nine feet; each gangion is five or six feet long and has a hook attached to its free end. Hence, there are about twenty-five hooks to a line; and a complete skate, of eight lines, will have two hundred hooks.

For bait, fresh salmon is said to be particularly desirable. Since this can not always be readily obtained, the fishermen have various substitutes for it. Frozen fresh herring is frequently used; and, as a last resort, salt herring. If a boat's supply of bait becomes exhausted, the men resort to the expedient of cutting up, and baiting the hooks with fish other than halibut which have been taken on the lines. Red rock-fish (*Sebastes* sp.), "black cod" (*Anoplopoma fimbria*), and "ling cod" (*Ophiodon elongatus*) all serve as this emergency bait, which is technically known as "gurry." Oddly enough, neither halibut flesh nor ray flesh, when it is used for bait, is taken by the halibut!

When the boat has arrived on the fishing banks, soundings are made until favorable bottom is located; a small sample of the bottom is picked up by soft soap or tallow in the lower surface of the sounding lead. Meanwhile, the gear is baited, and everything made ready for a "set." Frequently a trial set is made, to determine the prospects for a good haul; one skate of gear is usually put down and allowed to lie for a couple of hours. If the results of this are good, the other dories are lowered; if they are not good, the boat's berth is shifted and reshifted until a favorable fishing place is located.

In "setting" a skate of gear for fishing, the procedure is as follows: To a small keg, which serves as a buoy, is attached one end of a long line, the buoy line, whose length depends on the depth of the water; the keg is then thrown overboard, and the line is allowed to run out. The other end of the buoy line is "bent on" to a small anchor, to which one end of the ground line is also bent. Being put overboard, the anchor sinks to the bottom, carrying down with it the ground line. Then, while one man slowly rows the dory in a direction previously

determined on, the other throws out the gear, a few feet at a time. When the end of the line is reached, the line is hauled taut for a few seconds in order to make it lie straight on the bottom of the ocean. An anchor is bent on and, with a buoy line attached, is lowered to the bottom; a buoy, fastened to this second buoy line, is heaved overboard. This act completes the setting of the gear. For any but trial sets, generally three skates of gear, or, not infrequently, more than that, to a dory, are used. In that event they are usually fastened end-to-end, although occasionally they are set separately.

The gear is allowed to remain down—to “soak” is the technical term—for at least two hours; but a “soak” of three or four hours is advocated by many fishermen. The length of time is regulated somewhat by the kind of bait used; fresh herring is not left down much over an hour and a half, because it tears off easily; salt herring is given a soak of three, four, or even six, hours, to allow time for the salt to dissolve out of it; fresh salmon will stand a three-hour soak well. However, no definite rules can be laid down, and each fisherman is guided by circumstances and by his own experience. At the end of the allotted time, one man busies himself with hauling in the line; the other disentangles any snarls, removes fish and bait from the hooks, and coils down the line in the dory. This done, the boat is signaled for; she having come alongside, the fish are taken aboard in a sling, and then the dory is hoisted. All hands immediately turn-to, to dress the fish, which are iced down in the hold. A catch of 500 pounds of halibut to the dory is considered “good fishing.”

When ten or twelve dories are operated, they are spaced from half a mile to a mile apart, and the lines are set parallel to each other. Consequently, a considerable area of ground is fished over. It is estimated that, in one “set,” a boat running twelve dories can cover thirty-six square miles of fishing ground. And commonly two sets are made in a day.

Several trips are made during the season, which, because of the severe winter storms, lasts only from spring to early fall. Operations are continued, either until the boat contains all the fish she can carry, or until supplies are needed; thereupon the boat returns to port and disposes of her catch, which is either distributed to local dealers, or shipped in ice to more distant markets.

## **PUBLIC FISHING vs. PRIVATE HUNTING.**

By F. M. NEWBERT, President California Fish and Game Commission.

The state legislature, in 1911, enacted section 4085½ of the Political Code, which grants to the county boards of supervisors the right to condemn a public highway for the purpose of fishing along the banks of any stream stocked by the state which does not run through cultivated land. Prior to the passage of this act there was much determined opposition offered to the bill by certain people who held that such a law would have the effect of breaking down the powerful trespass law in force in the state. It was also argued that the bill meant confiscation of property rights and was in direct conflict with the constitution. However, the bill was passed and signed by the governor.



In this act there is no confiscation of property without just remuneration. The county must purchase such a right of way after due process of condemnation. Further, the people of this state have been taxed from 1871 to 1909 for the upkeep of the hatcheries and for the importation and distribution of valuable food fishes. It is estimated, on reliable authority, that fully 95 per cent of the fish now in our streams are the result of the work of the Fish Commission in the importation, artificial propagation, and distribution of fish. Since the people have had to pay for the hatching and distribution of practically all the fish in the streams, it certainly follows that they should have the sole and exclusive right to partake of them, subject to such rules and regulations as they themselves enact into laws through the medium of their representatives. Inasmuch as they have signified their intention to protect property from wanton destruction and to give just remuneration to those whose real estate is needed in the further advance of community interests, it also follows that they may call upon any person to allow free access of the public to the fishing streams they have stocked, and to remunerate him for the loss of the needed part of his estate.

This is certainly just and equitable when the required strip lies wholly upon wild lands not in any manner devoted to agricultural pursuits. In the peaceful entering upon wild lands for the purpose of fishing, the disciple of Isaac Walton carries no more dangerous weapons than his rod, line and hooks. The danger of maiming or otherwise injuring stock is reduced to a minimum, and the loss to the individual through the forfeit of his sole and exclusive right to fish in that stream is nil.

On the other hand, we have the time-worn and vexing question of private game preserves or hunting grounds. The erroneous idea prevailing among some people regarding these institutions is founded upon a lack of information concerning them. The people at large have not taken the time to correctly inform themselves upon this subject. It is claimed that private hunting grounds may be done away with and the self-same argument used in the matter of public fishing is advanced against them. But the positions of the two questions are not analogous in any particular. Can we exercise the right of eminent domain against the private hunting ground, or can we condemn it in the interests of the great mass of hunters, and yet be just and equitable to the owner of the land? We must take into consideration the natural elements entering into the question, and, in so doing, we would commence with the most prominent bone of contention, the "duck club."

The greater portion of duck club grounds furnish the best stock pastures in the state. On the duck-shooting grounds of the Sacramento and San Joaquin valleys you will find more grazing stock to the acre than anywhere in the uplands. While this territory is covered with water the year round it is not flooded merely to make it a rendezvous for the waterfowl. Nature herself is responsible for these immense areas of water. The water is from six inches to two feet in depth over the whole area and you will see stock feeding upon the succulent aquatic grasses and plants that spread their heads above the surface. The whole area is enclosed in a stock-tight, barbed wire

fence to keep the pastured stock from wandering. But when the annual floods come, pasturing is at an end and the duck club becomes a thing of the past.

Now the owner of valuable lowland grazing areas must certainly have the right to utilize those lands for whatever purpose he desires as long as he does not infringe upon the rights of adjoining property owners. If he wishes to prohibit hunting altogether he may post his land according to law, as does the upland owner. The latter certainly does not care to allow indiscriminate hunting by irresponsible hunters and suffer the possible chance of injury to his grazing stock. This upland owner is very desirous of maintaining the law that enables him to keep hunters off his land, yet he raises his voice in anathemas against the "duck clubs." His execrations are born of thoughtlessness. If a law is good for the upland farmer, why is it not good for the lowlander? If this lowland farmer wishes to rent the hunting privileges of his land and to so safeguard his interests that he can hold his lessees responsible for all damage done by them, is it possible to prevent him from so doing?

This lowland farmer leases to a club the sole and exclusive right for them to enter upon his premises for the purpose of hunting. There is written in that lease an iron-clad clause to the effect that the members of the club, jointly and severally, are responsible for any damage accruing to either his real or personal property contained in the premises. Since this owner has granted to a few responsible people the all and exclusive right to hunt thereon, does it follow that he should extend that privilege to every applicant? If such were the law, how would the owner be remunerated for the loss of stock? Could ten days in the county jail for a stock-killer bring back to this outraged owner one thoroughbred animal?

Consider the position of the upland farmer without the protection of the trespass law. We will take, for example, a hunter who goes out to one of these upland ranches wherein stock is pastured. Within an hour he bags the limit of quail. He immediately returns to town and spreads the good news. Can you hazard a guess as to the number of nimrods present upon that ranch the next morning and can you estimate the probable death rate among the cattle caused by those hunters who "thought the calf was a covey of quail just rising?" If we take away the right of the upland farmer to post "NO HUNTING" signs and the protection of the trespass law, no rancher in any game country could keep even so much as a milch cow or a single horse in his pasture. But he enjoys the protection of the same law that prevents indiscriminate hunting upon the property of the lowland farmer.

The erroneous idea of what duck clubs really are has made some people conjure up in their minds a veritable ogre. People who have never thought of them save that "they were a curse to the country" believe they are vast stretches of water and tule of unknown depth with here and there a bleak little island for the hunters to stand upon. They can see, in their mind-picture, attendants busily strewing wheat, rice and other grain over the water to attract the waterfowl which fly over in a sun-obscuring cloud and alight upon the water. They also see the hunters shooting from early morn until

late at night, day after day, while attendants feverishly reload the guns and bring refreshments to the busy shooters. It is a wonder that these people can call this sport, when such grilling work would call for the greatest of hardihood and endurance.

It is not generally known that practically every duck club in this state has written in its by-laws a prohibition against shooting more than two days in any one week during the open season and none at all during the closed season. A violation of this clause or of the bag-limit law will cause a member's expulsion from the club and the forfeit of his membership. The capital he has invested in his membership would, in many instances, cause a considerable personal financial flurry.

Many duck clubs own their own grounds and they, in turn, lease the grazing privileges. Now could we, by any form of law, prohibit these men from owning that property? Could we force them to allow free access to their land to every man with a gun, simply because they themselves hunted there? Is it possible to confiscate that property simply because it is hunted over about two months in the year and grazed the remainder?

Suppose the state appropriated \$500,000 for the purchase of duck grounds. When this purchase was consummated who would enjoy this expenditure of the taxpayers' money? Answer: The retired capitalist and the market hunter. Stop and think it over.

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#### OUT-OF-DOORS.

Away from the busy city and the ceaseless clang of the street,  
And the piles of brick and mortar and the tramp of hurrying feet;  
Away from the crash and clatter and the worrying, wearying strife,  
Come, ride with me o'er boundless plains and thrill with the joy of life,  
Where blue is the vault of heaven, and the Master that man adores  
Is everywhere in Nature, in His own great Out-of-Doors.

The forests sing their welcome; they bid us a moment give,  
To come and commune with Nature, and learn what it is to live,  
Where, watchful, the mighty mountains eternal vigil keep,  
Or where swiftly swirling waters will lull our unrest to sleep;  
Where by the evening campfire, " 'Tis joy to forget old scores."  
Remembering only that we are men in God's great Out-of-Doors.

*Selected.*

## CALIFORNIA FISH AND GAME

A publication devoted to the conservation of wild life and published quarterly by the California State Fish and Game Commission.

Sent free to citizens of the State of California. Offered in exchange for ornithological, mammalogical and similar periodicals.

All material for publication should be sent to **H. C. Bryant, Museum of Vertebrate Zoology, Berkeley, California.**

April 10, 1915.

Everyone owns a share in the natural resources of this state. The protection and conservation of game is, therefore, to the interest of every citizen.

### "CONSERVATION THROUGH EDUCATION."

There seems to be no end to the sentiment favoring our motto: "Conservation through education." When the federal bird law was being discussed in congress, Representative Linthicum of Maryland said:

"We should begin a campaign of education, teaching not only the pleasure to be had from a closer acquaintance with our bird friends, but also the benefits which farmers derive from their presence. To many it has never occurred that man is the only living creature who takes life for sport or pleasure; others take life, but when they do so, it is always for food or in self-defense—never for pleasure alone. Legislation alone will never assure that complete protection toward which this measure is a step. Real protection will come through educating our people as to the value of birds, that they may realize the part played by them and other inhabitants of our fields, forests and streams as economic factors in our everyday life. Unless backed by strong public cooperation, legislation will accomplish little."

### ORGANIZATIONS DEFENDING WILD LIFE.

The growth of sentiment in favor of wild life conservation is showing itself in a number of ways. One noticeable

thing has been the growth of a number of societies having for their object the protection of wild life. Besides such older active organizations as the Cooper Ornithological Club and Audubon Society, there are now four other societies more recently formed whose distinct purpose is to stir up interest and actively work for better wild life conservation. A list of these more recent organizations, with the names and addresses of their presidents and secretaries, is given below.

California State Fish, Game, and Forest Protective League—J. B. Hauer, president, 216 Pine street, San Francisco; J. Sherman Woolf, secretary, Monterey.

California Associated Societies for the Conservation of Wild Life—Dr. William F. Bade, president, 2223 Atherton street, Berkeley; Dr. W. P. Taylor, secretary, Museum of Vertebrate Zoology, Berkeley. Established 1912, composed of many prominent organizations, such as the Sierra Club, California Academy of Sciences and the State Humane Association.

The Wild Life Protective League of America, Department of Southern California—Charles F. Holder, president, 475 Bellefontaine street, Pasadena; Major F. R. Burnham, D.S.O., secretary, Fresno. Established 1914.

California Wild Life Defenders—Henry C. Hall, president, Corte Madera; Harry Harper, secretary, Capitola. Established 1914.

The last-named organization is the latest to take the field. Its secretary, Harry Harper, was formerly secretary of the California State Fish, Game, and Forest Protective League. The motto of this new organization is: "For Our State. For Its Streams and Forests. For Its Song Birds and Flora. For All Its Wild Life—and So, at the Last—For Our State."

The California Federation of Women's Clubs, with 30,000 members in the state, has organized a committee for the conservation of wild life, with Mrs. Harriet Williams Myers as chairman. This shows that the women of California can be depended upon to support wise conservation measures.

All of the above organizations have taken an active part in supporting certain measures relative to fish and game proposed during the last session of the legislature.

### IS BIRD PROTECTION WHOLLY SENTIMENTAL?

Many people seem to believe that bird protection is wholly sentimental. Look far enough into the subject and you will find that it is largely economic. The Rockefeller Foundation has just paid \$225,000 for 85,000 acres in Louisiana, which is to be used solely as a refuge for migratory birds. Surely there is more than pure sentiment behind such a gift as this.

The property so recently purchased by the Rockefeller Foundation is near Marsh Island, which, in 1912, was secured by Mrs. Russell Sage for the same purpose.

bird protection. A visit to Golden Gate Park, San Francisco, Peralta Park, Oakland, and Southside Park, Sacramento, will show thousands of water fowl congregated on the lakes in these parks. Even though Lake Merritt, in Oakland, is situated almost in the heart of a great city, the ducks there have become so accustomed to protection that they can be approached within a few feet.

In some places the lakes have been made attractive to wild fowl by keeping pinioned ducks. In Southside Park, Sacramento, a number of pinioned geese are also to be found. Last year Mr. Neal secured some eggs of the wood duck and



FIG. 30.—Ducks on pond at County Infirmary, Oakland, California. As ducks are protected and fed here, they congregate by the thousands. Photograph by F. C. Clarke.

and adjoins a 60,000-acre tract which its owner, Mr. E. A. McIlhenney, has devoted to bird protection. When the Foundation carries out its intention of acquiring the nearby land these refuges will become one great bird preserve of 500 squares miles, covering a frontage of seventy-five miles on the Gulf Coast.

### CITY PARKS AS GAME REFUGES.

There are three vivid examples in this state of what may be done in the way of

had them successfully hatched. As a result, this, the most beautiful of all ducks, is to be seen on the lake in Southside Park. Although able to fly, these ducks seem to be well satisfied with their home in a city park.

It takes but a very small body of water to furnish a refuge for water fowl. At the County Infirmary, in Oakland, a large reservoir has been made to teem with water fowl each winter by keeping a few pinioned ducks thereon. (Fig. 30.)

**BREEDING DEER FOR THEIR HORNS.**

The following extract from a letter by Frank N. Meyer, Agricultural Explorer, Office of Foreign Seed and Plant Introduction, U. S. Department of Agriculture, to his chief, dated Omsk, Siberia, July 17, 1911, which appeared in the *Journal of Heredity* for February, 1915, describes a remarkable industry now thriving in Siberia:

In Birel we stopped with a farmer who had become a wealthy man through the sale of stag antlers, and saw how the women folks were boiling several magnificent pairs. They were all coated yet with the down, which is an absolute necessity to sell them, as the Chinese take only those which are young. This stag-keeping business has its headquarters in and around Birel, and by pure accident we had stumbled upon one of the most interesting industries in this world.

It seems that about forty years ago somebody in Birel made an experiment of keeping some stags in captivity and by sawing the antlers off and bandaging the wounds, showed that a stag can be deantlered and survive the process and be operated upon every year. Up to that time the animals had been hunted until they were well nigh extinct, and the collecting of antlers was a very unsteady sort of business—one never knew whether one would get much or not. Well, the animals multiplied and high-fenced enclosures were established all over the mountains, for these stags need much ground to pasture upon, otherwise they don't remain healthy. And today there are several thousand stags in and around Birel, and the income derived from the sale of the antlers has made some people very wealthy, for every male animal produces about 70 roubles\* worth of antlers every year, and some men have as many as 400 males. The average price paid for the antlers is between eight and twelve roubles per pound, according to the market.

The antlers are sawed off with a fine saw and weigh, fresh, twice as much as later on. They have to be boiled in salted water and very great care has to be taken that the felt-like covering doesn't come off; therefore, they are boiled several times, and each time allowed to dry out again. When sufficiently cooked, they are hung in the wind and allowed to dry thoroughly, and in that state they are bought up by dealers and said to be exported to China via Mongolia. The Chinese, as you may know, believe thoroughly in the rejuvenating and stimulative power of young deer horns, and the stuff, scraped and powdered, forms a valuable ingredient in certain of their medicines. I was also told that a firm in St. Petersburg has taken up this mat-

ter and is manufacturing a special medicine from them, under the name of "Spermine."

**PHEASANT FARMING.**

There has recently been published under the direction of Wm. L. Finley, Oregon Fish and Game Commission, a beautifully illustrated bulletin on "Pheasant Farming," written by 'Gene M. Simpson, Superintendent of the State Game Farm at Corvallis, Oregon. In the introduction Mr. Finley states that the bulletin, which is a revision of a former one, is designed to furnish reliable information as to how pheasants may be successfully propagated. He also pays a tribute to Mr. Simpson, who has been particularly successful in rearing pheasants on the state game farm.

The first chapter discusses the propagation of game birds and defends the rearing and sale of such birds. Chapter 2 describes the different varieties of pheasants. The chapter devoted to "The Chinese Pheasant in Oregon" furnishes information as to the history of the introduction of this bird into Oregon and the success which has been obtained in establishing it. The succeeding chapters discuss the equipment for a pheasant farm, the ideal mother for pheasants, the food of young pheasants, enemies of the game breeder, and advice to the beginner.

This bulletin sums up the very information which the man who is starting a pheasantry desires. As it is the result of long experience, it can be successfully used as a handbook by the pheasant breeder. It is to be hoped that there will soon be enough demand in California for such a publication. As yet the breeding of pheasants in captivity in this state is in its infancy.

**A GUIDE BOOK FOR SCIENTIFIC TRAVELERS ON THE PACIFIC COAST.**

The Pacific Coast Committee of the American Association for the Advancement of Science is preparing a guide book for the use of visiting members to the San Francisco meeting, August 2 to 7, 1915. The book will be about the size of a Baedeker and will be published by Paul Elder & Company. The exact title will be "A Scientific Traveler's Guide Book to the Pacific Coast," and it will bear the sub-title "Nature and Science on

\*A rouble is worth about 51 cents, U. S. currency.



the Pacific Coast." This book will contain chapters upon the distinctive features of the region, including geology, palaeontology, geography, distribution of land animals, fisheries, marine biology, flora and forests, marine botany, ethnology and archaeology, agriculture, influence of early Spanish settlers, landmarks of history and literature, and the evident effects of an out-of-door life upon the development of the fine arts. These chapters will be critical descriptions written by men who are authorities in the several fields. General maps of the region and maps of the vicinities of the larger cities, directions for reaching the principal points of scenic and scientific interest on the Pacific coast, and directories of educational and research institutions will also be included. This book can be procured from the general office of the American Association or from leading book stores on the Pacific coast. The price will be \$1.50.

#### THE PROTECTION OF NON-GAME BIRDS.

It seems to be impossible for a single session of the state legislature to go by without a bill being introduced to remove from protection such birds as the meadow-lark, blackbird, and robin. In back of every such move is to be found a desire on the part of the city sport (we can not say sportsman) to have something more to kill. When such a bill was introduced in the last legislature by a San Francisco assemblyman the following comment appeared in the *Fresno Republican*:

The question of the usefulness or injury of these birds is a scientific one upon which we would rather have the judgment of the zoological department of the university than that of any aspiring restaurant keeper in San Francisco. And so far as the restaurant end of this world shaking problem is concerned, there is a much better and easier way of meeting it. We do not need blackbirds, meadow-larks, and robins for our bird pies. There are billions of English sparrows in the state which are doing no good to anybody. The United States government has devised methods for the easy capture of the sparrows, by trapping, in large numbers. Let the restaurants introduce sparrow pie as a diet if they will. There are plenty of sparrows and the pie is said to be good.

#### AN OUTBREAK OF QUAIL DISEASE.

The United States Department of Agriculture reports that the third known outbreak of quail disease has been discovered by the Bureau of Animal Industry. Quail disease is a highly infectious malady to which all native quail are apparently subject. The first outbreak occurred in 1907 and a second one occurred in 1912. The one in 1912 was checked through the suspension of importations of birds from Mexico. Birds imported from Mexico, at Brownsville, Texas, on January 5, 1915, were found infected with the disease. All game commissioners and sportsmen who may have purchased birds for restocking this season are requested to advise the Bureau of Animal Industry if any of the birds are known to have died from disease of any kind. A quarantine has been established at Brownsville and every attempt will be made to prevent the spread of this exceedingly dangerous disease.

#### IS THE HOUSE CAT A DESTROYER OF BIRDS?

Mr. E. H. Forbush, State Ornithologist of Pennsylvania, is collecting data on house cats. He has sent out circulars asking for information as to the depredations committed and the comparative value of this animal as a destroyer of redent pests. He plans to issue a bulletin on the subject, giving the results of his investigation. Of recent years the house cat has often been branded as an enemy of bird life. It is certainly true that stray cats which have no home and who live in almost a wild state do destroy many birds. Whether all cats will have to be placed in this same category remains to be seen.

#### PRICES DROP ON RAW FURS.

A St. Louis fur importer is authority for the statement that the losses on American raw furs caught last season alone, will amount to ten million dollars. This is due to the fact that most fur manufacturers are located in Germany and France. All price lists sent out since the first of the year show that only about half of the price paid last year is now being paid for raw furs.

### KEEP YOUR FILE OF "CALIFORNIA FISH AND GAME."

We wish to urge all of our readers to carefully guard their file of "California Fish and Game." We hope that, as years go by, this periodical will increase in size and importance. We believe that already the material to be found in the first numbers has been of sufficient interest so that readers will wish to keep the back numbers for reference. Already the first number of "California Fish and Game" is at a premium, there being but a very small number of copies left for filling sets. For several months past "Forest and Stream" has been advertising for a complete set, or for certain old vol-

umes for filling sets. A number of important university libraries have been attempting to complete their files for several years, but the early numbers of the magazine are not now available. The papers now being published in "California Fish and Game" are not only of interest to the general reader, but they are of value to the scientist and, as years go on, the early numbers will become more and more valuable. It is impossible for the Commission to issue very large editions, hence the necessity of conserving back numbers. If the added incentive of financial return is needed, we need but point to the prices paid for early numbers of similar periodicals.



FIG. 31.—New hatchery (E) at Sisson, completed January 1, 1915.

## HATCHERY AND FISHERY NOTES.

### HATCHERY ACTIVITY IN 1915.

On January 1st the new hatchery building at Sisson Station was completed (see fig. 31). The building is 195 feet long by 42 feet wide and has a capacity of 148 hatching troughs (see fig. 32). It will be used for hatching and rearing both salmon and trout. At the present time the building is nearly full of salmon eggs and embryo fish.

We have received at Sisson Station, from the U. S. Bureau of Fisheries stations at Battle Creek, Mill Creek and Klamath River, approximately 29,000,000 salmon eggs, to date. About half of the eggs received have hatched out and the embryo fish are doing nicely. Prior to the arrival of the first of the eggs, all of the buildings were put in excellent shape for the reception of the salmon eggs, and

with the completion of the new hatchery building everything was in readiness for the season's work. All four of the salmon hatchery buildings at this station will be crowded to capacity this season. As soon as the embryo fish reach the swimming stage, we will commence feeding them, and will hold and feed the fry in the hatcheries and nurseries until they have attained such size as will insure their being well able to protect themselves from their natural enemies, when they will be released in waters suitable for them.

The spawning of the Eastern brook and Loch Leven trout at Sisson Hatchery has been completed. About 1,757,000 Loch Leven and 1,198,000 Eastern brook trout eggs were taken from the fish in the ponds at this station. The eggs are hatching and the embryo fish are in excellent condition. During the coming month we will commence spawning the rainbow trout in the Sisson Hatchery ponds, and the indications are that we will secure a nice take of eggs from these fish.

The preliminary work for opening up the rainbow egg collecting stations, auxiliary to Sisson Hatchery, has been commenced. As the two stations, Camp Creek and Bogus Creek, on the Klamath River, were put in excellent shape for operations last season, very little repair work will be necessary this season. Both plants have been inspected during the past two weeks and were found to be in excellent condition for the season's operations. During the coming month we will send a crew of men to these stations to put in the traps and prepare for the run of spawning fish.

During the past year I have thoroughly investigated the Pit River country, with the idea of increasing our rainbow trout egg collecting operations. I found that rainbow trout ascend the tributaries of the Pit River in considerable numbers. From my investigations I found that Burney Creek seemed to have the largest run of fish, and I, therefore, selected a site suitable for carrying on the work. A lease was secured on the site selected, and I have just completed the final survey for the installation of the racks, trap, etc. Within the next two or three weeks I will have a crew of men on the ground, preparing the station for the season's operations. I believe that the Burney Creek

Station will prove to be one of the best egg-collecting stations in the state.

During the spring of 1914 the old Snow Mountain Station, located at Snow Mountain power dam, Mendocino County, was operated by this commission, in an endeavor to ascertain whether it would pay to operate the plant on a large scale. The results obtained from the experiment were very gratifying and we collected a very good take of steelhead trout eggs. Accordingly, I made arrangements during the summer to have the station enlarged and put in first-class condition. The fish ladder over the dam was in poor condition and the traps were old and nearly useless. During the past fall, I had a crew of men engaged in putting everything in readiness for this season's work. The ladder was repaired, traps installed, eyeing troughs and building enlarged and repaired, and a new water supply system installed. The work was completed during the fore part of this month and everything is now in first-class condition. We should collect a large take of steelhead trout eggs at this station this season. Part of the eggs collected will be shipped to the Ukiah Hatchery to furnish fry for stocking portions of Mendocino and Sonoma counties, and the balance of the eggs will be hatched out at Sisson Station for stocking steelhead waters throughout the entire state.

During the month of March the Tahoe Hatcheries will be opened up. Traps will be installed in Blackwood Creek, as in past years, and the seining crew will commence operations at the mouth of Taylor Creek as soon as the black-spotted trout of Lake Tahoe commence to run up the streams to spawn. This work will be under the supervision of Mr. E. W. Hunt.

The Scott Creek egg-collecting station will be operated to its fullest capacity this season. It is the desire of the board to collect a large number of steelhead trout eggs this season, so that the work of stocking the coastwise streams with large, well developed fry, may be carried out on the same lines as in the past two years.

At the Price Creek Hatchery 3,000,000 salmon eggs are now hatching. The fry obtained from this hatch will be distributed in Mad River and the streams flowing into Humboldt Bay, as well as in the

lower reaches of Eel River. The upper reaches of Eel River will be stocked with salmon fry by the Fish Commission's distributing car this season. Owing to the large number of salmon that ascended the river during the early fall freshets, the natural propagation will be larger than usual. The storms raised Eel River before the fishermen had a chance to take many of the salmon from the pools in the lower river, consequently a larger number of mature salmon ascended the river to spawn than usual.

The Fish and Game Commission is planning a hatchery for the district south

markets from Portland and Eel River and the old question arose, Were they salmon or steelhead?

The usual characters by which salmon and steelhead are distinguished are the size of head, shape of tail and number of rays in the anal fin. In the shipments these identification marks had been removed. The fish were dressed and the heads, tails, and anal fins removed, very evidently for the purpose of preventing identification. As it was lawful to have salmon, but unlawful to have steelhead in possession, the question was a vital one. A microscopic examination of the scales

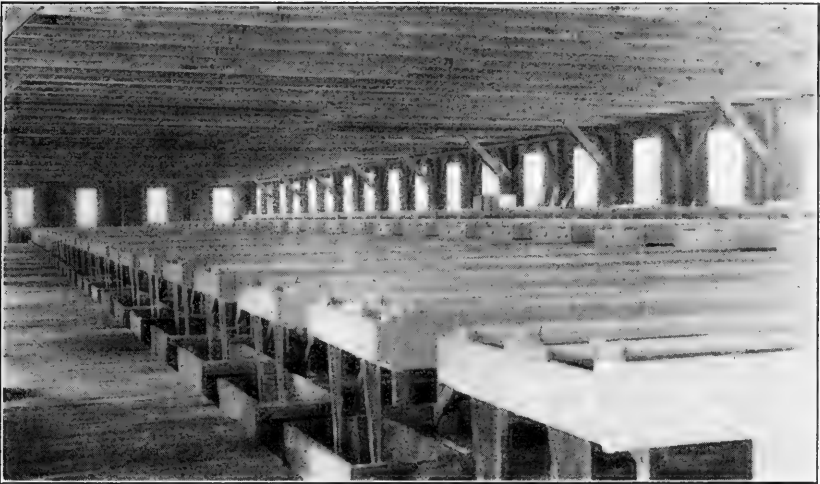


FIG. 32.—Interior of new hatchery (E) at Sisson. This building contains 148 hatching troughs.

of the Tehachapi. It is the intention of the board to establish a hatching station in southern California to propagate enough fish to stock the streams in the southern part of the state, if a suitable site can be found. It will be more economical to hatch and distribute the fry from a hatchery located in the south than to ship the fish from the northern stations.

—W. H. SHEBLEY.

#### IDENTIFYING FISH BY THEIR SCALES.

The Fish and Game Commission has been making practical applications of the knowledge gained in the last few years in the study of fish scales. Shipments of fish came to San Francisco and other

showed conclusively that they were steelhead, and gives the evidence upon which the violator can be prosecuted.

The concentric rings of growth on the scales of trout and salmon show winter and summer growth, much as do the rings of growth on a tree. Also, the growth in fresh water can be distinguished from the growth in salt water. Steelhead, after hatching from the egg, spend from one to three years in the stream before going to sea, but the great majority of individuals remain two years in fresh water. The salmon, on the other hand, spend one year, or less, in fresh water and then pass out to sea. Scales from the fish in question showed two years' residence in fresh water, which is proof enough they

are steelhead. But the scales give an additional proof, in the presence of "spawning scars." A steelhead leaves the sea and enters fresh water to spawn, and, during this process, leaves off feeding to a great extent and becomes thin through the absorption of the fat of the body. Even the edges of the scales imbedded in the scale pockets of the skin are eaten away, so that when the fish begins feeding again the scales take on new growth and a scar is left representing the ragged, eaten-away edge of the old scale. This constitutes the "spawning scar." Five per cent, or more, of steelhead show in this manner that they have previously spawned. Not so in the case of the salmon. They never show the "spawning scar," for they all die after spawning and growth is not resumed before death. Some of the fish examined in this instance showed these spawning scars, thus giving the additional proof that they were steelhead.

The only salmon with which the steelhead is likely to ever be confused is the silver salmon, or coho salmon. The silver salmon invariably matures and spawns at three years. In the case of the steelhead, spawning individuals will be found ranging from three to six years of age—all of which is clearly shown by the scales. N. B. SCOFIELD.

#### ANNUAL FISHERY PRODUCTS OF CALIFORNIA.

The fisheries of California take annually \$6,900,000 pounds of fish, for which the fishermen receive \$4,000,000.

Five thousand men are engaged in fishing for profit in this state.

Fishing gear, including boats, nets and lines used in the state, is valued at \$1,250,000.

#### TUNA INDUSTRY.

The tuna industry has grown until now it is the largest of our commercial fisheries. During the past season, the canners of southern California put up 350,000 cases, which were worth, wholesale, about \$1,000,000. The weight of the fish required for this number of cases was 25,000,000 pounds, or more than double the total weight of salmon taken in the state. Besides this, 1,000,000 pounds were salted, dried or fresh. The long-finned tuna, the only variety canned, is

a fish of wide distribution and spawns in the tropical waters of Mexico. It comes north in countless numbers, following the schools of sardines upon which it feeds. It is not believed that the present large take of tuna will seriously reduce the supply. At least, no action is contemplated to restrict fishing, as no young or spawning fish are taken in the state waters.

#### A NEW FISH HATCHERY FOR SAN BERNARDINO COUNTY.

Due to the interest and energy of the San Bernardino Trout Association, San Bernardino County now has a trout hatchery with a capacity of four million fish. The hatchery is located on the south side of Bear Lake and cost about twelve hundred dollars. It was built under the supervision of Mr. E. W. Hunt, superintendent of the Tahoe Hatchery.

The expense of the hatchery is to be borne by the members of the county association, and no money will be solicited outside of the county. The Board of County Supervisors will have charge of the distribution of the fish hatched and will see to it that local streams are well stocked with the output.

The stated purposes of the San Bernardino County Trout Association are as follows:

To finance and build a hatchery in Big Bear Valley and to use the output for the replenishing of the trout supply of the streams in San Bernardino County.

To turn the operation of the hatchery plant over to the State Fish and Game Commission.

To turn the distribution of the fry material over to the San Bernardino County Supervisors.

To promote, protect and further the game and fish supply of the county in every way possible.

To in no way interfere with the work of the State Fish and Game Commission, but by direct means, by its influence and membership to increase its usefulness.

#### MARKET FISHERMEN DISSATISFIED WITH FISH LAWS.

In southern California the market fishermen are working earnestly to secure the repeal of several sections of the fish and game laws during the session of the legis-

lature. There are two measures especially which they wish repealed. One is the law creating a fish reservation around Santa Catalina Island, and prohibiting the use of all nets within three miles of the shore of the island. And the other is

the law prohibiting the use of paranzella, or trawl nets, in the sixth district. The fishermen claim that these provisions practically ruin the market fishing along the coast of southern California.

## CONSERVATION IN OTHER STATES.

### A NEW DEVICE TO PROTECT BIRDS.

The general interest in bird protection has been productive of the invention of a device by Herr J. P. Thijse of Utrecht to reduce the destruction of birds by light-houses. The device has already been placed on two British lighthouses and is said to be giving excellent results. Light-houses have long been instrumental in destroying great numbers of migrating birds, which have been attracted by the light during stormy weather. In some places thousands of birds kill themselves by flying against the light on each stormy night during the migration season. The new device now being used in Great Britain is reported to be a series of perches on which the storm-driven birds can alight and rest until morning.

### MORE WILD LIFE REFUGES.

The Minnesota Game and Fish Commission is planning to establish a chain of wild life refuges in that state. The plan is not, however, that instituted by Indiana and adopted by Iowa, of permitting landholders to post their farms as state game preserves, allowing them to shoot "rabbits" on these "preserves" and supplying them with expensive exotic game birds for "stocking" purposes.—*Recreation*, December, 1914.

### HOW TO ATTRACT BIRDS IN NORTHEASTERN UNITED STATES.

Farmers' Bulletin, No. 621, of the United State Department of Agriculture describes means of increasing the number of birds about homes in the northeastern United States. Methods of furnishing birds with nesting places, food, and water are described and figured, and methods of protection are also suggested. Emphasis is placed on the furnishing of food by means of plants and shrubs grown for that purpose. A table of seventy-five different native and introduced plants and shrubs are suggested as available for this

purpose and the comparative length of the fruiting seasons of each is figured.

It is the plan of the United States Biological Survey to publish similar bulletins, which will furnish accurate information along these same lines for other parts of the United States. While on the Pacific coast recently, Mr. McAtee everywhere gathered information so as to make possible such a bulletin dealing with the northwestern United States.

California is so well supplied with natural food for birds that there is not the same necessity for furnishing them artificial food plants. Nevertheless, we shall watch with interest these practical attempts to increase the number of birds in limited localities.

### BOY SCOUTS BECOME GAME WARDENS.

Under the leadership of M. D. Moser, twenty-one boy scouts of Tacoma, Washington, have been given a course of training in game protection. As a reward for their work the Game Commission of Washington has awarded them special badges. These boys are now doing good individual work, especially among the boys of the city, in protecting song birds. Recently these boys took a census of game birds in the vicinity of Tacoma. A great many game birds were found inside the city limits. Quail were most numerous, but great numbers of pheasants and grouse were also found.

### AN EUROPEAN EXPERIMENT IN PROTECTING BIRDS.

The famous ornithologist, Baron von Berlepsch, has for a number of years been carrying on some interesting experiments in furnishing birds nesting sites and food on his estate at Seebach, in Thuringia. So successful has the Baron been in these experiments that his estate is now used as a bird protection experiment station by the government.



Nesting sites are furnished by two methods. Carefully prepared nest boxes are inserted in stone walls and hung up in trees. In addition, suitable shrubbery has been planted in many places on the estate, and this is carefully pruned to form desirable nesting sites. Recently a hedge has been placed in the midst of an extensive grainfield some distance from any wooded area, in order to test the willingness of birds to use such an isolated spot.

Practically all of the nest boxes become occupied within a few years and the nesting sites provided by pruning trees and shrubs are almost all utilized. The "show spot" on the estate is said to be a thorn hedge along the edge of a small wood, where each bush has been pruned for nesting purposes. A recent visitor counted thirty-one nests in examining 300 feet of this hedge. Baron von Ber-

lepsch's experiments have been proving to the world for several years that the bird population on any given area can be increased by furnishing birds additional food and cover.

#### APPLIED ORNITHOLOGY.

Mr. Herbert K. Job, until recently State Ornithologist of Connecticut, has been placed in charge of a "Department of Applied Ornithology," established by the National Association of Audubon Societies. The function of this new department will be the furnishing of advice and assistance to the public relative to methods of increasing wild birds and propagating wild fowl and game birds in captivity. The department has a fund of five thousand dollars a year subscribed by interested persons with which to carry on its work.

### LIFE HISTORY NOTES.

#### WHISTLING SWANS IN THE SACRAMENTO VALLEY.

A large number of whistling swans (*Olor columbianus*) were seen along Cache Slough and on Grizzly Bay last winter. On December 13, 1914, on Cache Slough, a flock of fifty were seen in flight, twelve of which were immature, distinguishable by their grayish, instead of snow-white plumage. On December 14, on Grizzly Bay, flocks of forty-nine, nine, and another one containing between twenty and thirty individuals were seen. The birds appeared to be unusually tame. The general report from residents in this vicinity is to the effect that swans have been more numerous this year than for several years past. H. E. FOSTER.

#### CANADA GEESE NUMEROUS IN SACRAMENTO VALLEY.

In the vicinity of Rio Vista, Solano County, there has been a noticeable increase this season (1914-15) in the number of Canada geese (*Branta canadensis*). We have not had so many honkers for many years.

All geese arrived very late this season. Gray geese were the first to arrive, a few flocks being noticed about October 10. No white geese arrived until late in No-

vember. In fact, it was about the 10th of December before we had the usual flight of geese. All geese are much harder to decoy than in former years. They all seem to fly in one large flock and do not split up into small flocks.

S. C. CHURCH.

#### RING-NECKED PHEASANT BREEDS NEAR SAN BERNARDINO.

On April 22, 1914, I discovered a nest of the ring-necked pheasant (*Phasianus torquatus*) near San Bernardino, San Bernardino County. The record was published in the January-February "Condor," page 59. The bird in question (a female was all that I was ever able to see there) was reported by a farmer friend of mine to have a nest in a swampy weed patch on his farm. I at once investigated and was able to approach within a few feet of the bird as she was sitting on the nest. She was covering twelve eggs. I visited the place frequently within the next week or so, but was never able to locate her mate, but as there was a large swamp nearby well grown to tules and nettles it may be that the male was hiding there. Unfortunately a flood so dampened the nest that the eggs never hatched, although the bird kept to the nest almost

constantly for a period of about two months after the nest was discovered and the eggs were well along toward hatching when first found.

At first I thought that the above was the first time pheasants had been known to nest here, but later I discovered that others had hatched broods on several occasions in the past and on one or two occasions, at least, had reared broods. These birds are undoubtedly some that have escaped or been liberated by private individuals. Several have been liberated here in past years for the purpose of allowing them to breed and increase, but in my opinion these attempts have met with failure, mainly for the reason that the birds were liberated in the foothills and drier portions of the valley, whereas all that have been known to breed here have done so in the wet places around swamps or along the willow-covered banks of the streams flowing through the valley. I am convinced that if any organized endeavor was made to stock this section with the birds it would be successful, providing the right kind of ground was used—that is, the more moist and covered sections.

So far as I am able to ascertain, the only birds that have been successful in breeding here are those that have escaped from pheasantries. That even under these conditions, however, the birds are getting a slight foothold here is apparent from the increased number of reports of finding them heard among the sportsmen and farmers.

EDWARD WALL.

#### WHY DUCKS ARE DECREASING.

A comparison as to the number of different species of ducks this year and last would be of no value, unless the conditions which may have caused either the increase or decrease were given consideration.

Should I report to you that ducks were scarce this season without telling you of these conditions it would not establish the fact that ducks were becoming exterminated. A variety of conditions make for many changes in habits of waterfowl, especially migratory ducks and geese. I mean to say, climatic, feed, an abundance of water, early or late rainfalls or storms.

To illustrate my meaning: Should there be no early rainfall in California, and an

early cold snap with freezing in the north in October, November, or December, ducks would pass by California and we would see but very few of them, but, should the season be open in the north and with early rains here which would make feed plentiful, these ducks would appear more numerous than ever. Again, should there be a heavy rainfall, as in the case of the present season, enough to insure the growth of the duck feed for next season, then it would insure a large crop of California hatched ducks and an increased number of migratory ducks when the freeze closes the extreme northern feeding grounds.

We must be guided in estimating the number of ducks seen by the conditions existing. If I can know the weather conditions in Oregon, Washington, and British Columbia, knowing the existing conditions here in California, I can surely predict to a certainty the extent of the next crop of ducks, when they will arrive, and the particular species that will take advantage of those conditions.

Another instance: There were 20,000 acres of rice in the Butte Creek country this year\* and scarcely any water anywhere except that used to irrigate the rice and the waste water running off. Now, the scarcity of water in that portion of the valley forced all the early local ducks into that body of water and they were, apparently, more plentiful in that particular locality than in many years. But had there been early heavy rains these ducks would have scattered over a larger scope of country and then some persons would have said that ducks were becoming scarce.

The choice varieties—mallard, sprig, canvasback—from the Sacramento Valley are nearly all shipped to San Francisco, where there is a good demand and they bring the highest prices; consequently we have most of the common varieties here on sale—widgeon, spoonbill, etc. Occasionally a few other varieties are sold by what we call "pot hunters" who carry their game to town and peddle it. The proportion of home ducks the past season (1914-15) were apparently more plentiful than the migratory ones, for the reason that the migratory ducks, canvasback, bluebill, redhead, etc., require more or deeper water than we have, for our

duck grounds are not permanent lakes but mostly shallow overflowed grounds. If we had had an early rainfall in California, canvasback, redhead, blackjack, and bluebill would have been much more in evidence. However, we did not get the rain until too late. Consequently the big flight went south down the coast and we did not see them.

As to what species have decreased in the last ten years, and what are the causes, can be answered only after analyzing all the conditions mentioned. Should the island districts in the Sacramento-San Joaquin delta, comprising all the

very much the general appearance of into separate families or genera. Yet, on the State Game Farm at Hayward a remarkable instance of the crossing of widely different birds has taken place. There are now to be seen at the game farm five birds which are the result of a cross between a ring-necked pheasant cock and a white cochin bantam hen. Mr. Dirks reports that out of 229 eggs only 14 proved to be fertile and only 10 of the eggs hatched. The hybrids appear to be of two distinct kinds. Three of the birds are dark in color, whereas two of them are very light in color. The birds have

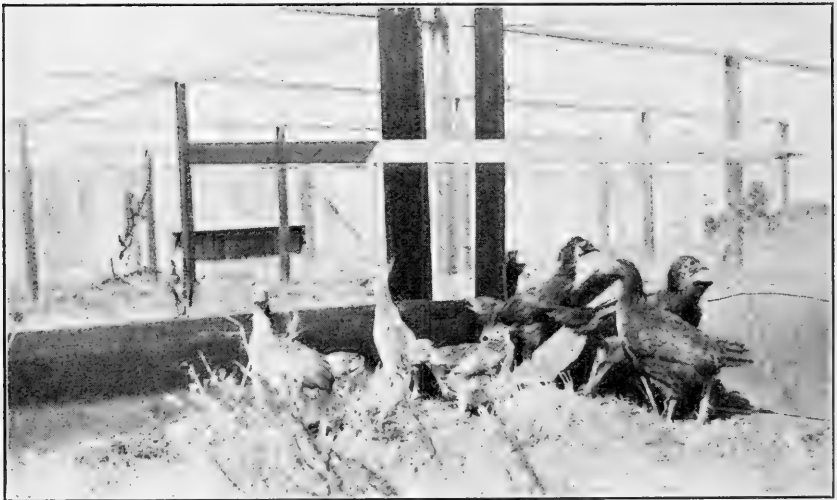


FIG. 33.—Hybrid birds at the State Game Farm at Hayward, California. They are a cross between a ring-necked pheasant cock and a bantam cochin hen.

overflowed and unreclaimed lands from Colusa to the mouth of the Sacramento River, return to the conditions existing before reclamation and remain so for a few years it would change the whole aspect of duck conditions in California, as it did during the floods of March, 1907, when all the islands in this district were flooded and apparently all the ducks in the world were in this area. In other words, it appears that ducks have decreased for the reason stated—lack of good feeding grounds. GEORGE NEALE.

#### STRANGE HYBRIDS.

As a rule, we think it is out of the ordinary to obtain a cross between birds or mammals divided by the systematist

pheasants, but cochin characteristics are shown in the feathering on the tarsi. (See fig. 33.)

H. C. BRYANT.

#### SEA OTTERS NEAR POINT SUR.

A letter from John W. Astrom, keeper of the Point Sur Light Station, dated February 2, 1915, gives the following information regarding the number of southern sea otters (*Lutra lutris neris*) found in that locality: "During my service at this station for the past six years I have seen a good many sea otters. Especially during February and March of each year there seems to be more than at any other time of the year. At the present time, if walking on the beach between Light Station and Big Sur River one can nearly

always see two or three sea otters playing on the kelp some distance off shore. A year ago in February, after a heavy blow, I counted fourteen sea otters on one patch of kelp. It appears to me that sea otters are increasing at least around Point Sur the last two years."

Mr. A. Novella of New Monterey writes as follows: "While on a trip down the coast about three months ago I saw thirty-two sea otters on the way down and twenty-six on the way back. I think there are more sea otters on this coast now than for a number of years."

Here we have more evidence as to the value of total protection as a means of bringing back a species which has been greatly reduced in numbers. Reduced nearly to extermination about three years ago, the sea otter is now beginning to show a slight increase. The conservation of no other mammal in the state could bring so large an increased income to our treasury, for the sea otter is the most valuable fur-bearing mammal in the world. Prime skins sold two years ago for over fifteen hundred dollars apiece. Since 1913 the killing of sea otter has been a high misdemeanor, punishable by a fine not exceeding \$1000. The enforcement of this law appears to be greatly benefiting the species. H. C. BRYANT.

#### AN ANIMAL WHICH LIVES WITHOUT WATER.

Two kangaroo rats (*Perodipus ingens* and *Dipodomys merriami* subsp.) cap-

tured over a year ago by Mr. H. C. Ohl near Mendota, California, have been kept in captivity in order to study their habits. The most extraordinary feature of these animals is that they are able to live for a long period of time with no water whatsoever. For over six months they have been kept at the Museum of Vertebrate Zoology, University of California, and have been fed entirely on rolled barley. Not a drop of water has been given them and they have not even been fed on green food. According to Mr. Ohl the smaller animal (*Dipodomys*) has refused water since its capture in October, 1913. Last summer the larger one occasionally drank water when it was placed in a hole in a block of wood. It dipped its front feet into the water and then drank what water adhered to them. Both animals seem to be in the best of health despite this treatment, which would have soon proved fatal to other animals. With the above facts at hand, it is not difficult to understand why kangaroo rats are so abundant on the desert in localities miles away from water.

The kangaroo rat is a small nocturnal animal found most abundantly in desert localities. During the daytime it hides in holes in the ground. At night it hops about searching for weed seeds, which it holds in its front feet while eating, much as a squirrel holds its food. The very large eyes and long hind legs which enable it to jump great distances, make identification of this unique animal very easy. H. C. BRYANT.

## WILD LIFE IN RELATION TO AGRICULTURE.

### ECONOMIC STATUS OF THE SEA GULL.

Sea gulls have increased enormously on the coasts of Great Britain. As a result there has been considerable discussion as to the real value of sea gulls. The Suffolk and Essex Fishery Board has been carrying on some interesting investigations regarding the feeding habits of gulls. Stomach examination has been depended upon for accurate information as to the food taken. Data regarding the circumstances surrounding the taking of the specimen has been recorded in each instance. The food of four different species of gulls and of two terns has been investigated.

Among the most interesting things which came out in the investigation were the results of experiments to show the rate of digestion of fish. It was found that the larger gulls were able to digest fish at the rate of four ounces per hour and smaller gulls at a somewhat slower rate. "Provided the bird's stomach is empty, when the fish is taken, a black-headed gull is able to digest a five-inch sprat within three hours, so that not a trace of any bones can be detected. As a result of experiments with sprats filled with methylene blue, it is certain that a gull shot in the afternoon, may show no traces of three or four fish taken in the morning."

Considering the destruction of all fish and of the food for fish, such as crustacea, crabs, etc., and the destruction of earthworms, carnivorous beetles, and cereals, by gulls as injurious and that the feeding habits of gulls are beneficial in so far as they destroy echinoderms in the sea and on the land, wireworms, injurious beetles and insects, and on occasions remove garbage, the investigation shows but fifty-three points in favor of gulls and 454 points against them. All of the gulls examined were taken on the sea coast. If some of them had been taken on the land a different result would have been obtained. The board in charge of the work has decided to continue the investigation and to devote particular attention to the land feeding gulls in the district, in order to investigate whether the harm done to fish and fish foods was counterbalanced by the benefits derived by the agriculturists.

#### DUCKS EAT OYSTERS IN WASHINGTON.

The United States Biological Survey has just completed an investigation into the depredations of ducks in the oyster beds of Washington and Oregon. Mr. W. L. McAtee, of the economic division of the survey, was in charge of this work. He reports that greater scaup ducks (bluebills) and white-winged scoters were actually causing damage by eating oysters on Oyster Bay, Washington. In other places damage was reported as negligible. The amount of damage, however, so the investigation showed, is to be reckoned as a few thousand dollars annually, rather than hundreds of thousands of dollars as reported by the oyster men.

Stomach examination showed that scaups took oysters an inch and a quarter in diameter and scoters some slightly over two inches. The only immediate remedy being used is to hire a man to shoot the ducks and frighten them away from the oyster beds.

This investigation, like many another one, has shown that the men concerned always exaggerate depredations by birds. Depredations such as these are more likely to decrease rather than increase, for the duck population is waning rapidly. Geese have now become so scarce in the

Sacramento and San Joaquin valleys that practically no complaint is heard of their depredations in grain fields, whereas formerly, when more numerous, men were hired to frighten them from the fields.

#### WHY PROTECT THE SEA GULL?

Fishermen continually censure the sea gull for destroying many fish and food which would otherwise be eaten by fish. The commuter, also, as he watches the never ceasing line of gulls follow the ferries back and forth, wonders of what use these soaring hoards can be. Their value as scavengers is certainly evident to everyone, but these birds of the sea have also a value to the agriculturist. We recently received a report from a well known ornithologist, to the effect that near Elmhurst, Alameda County, hundreds of gulls were seen feeding in a recently ploughed field and following the farmer as he ploughed. The particular species so benefiting the agriculturist is usually either the California gull or the ring-billed gull. The former was noticeably abundant on San Francisco Bay during the month of January, 1915, when the above observation was made.

#### ENGLISH INVESTIGATOR DEFENDS THE ENGLISH SPARROW.

That black-listed pest of the farmer and fruit grower, the English sparrow, is now being found to perform some service as an insect destroyer during the nesting season. The results of stomach examinations of nestling English sparrows show that the food consumption of a hundred nestling birds from fruit growing districts in England is nearly two thousand insects in a single day, and that the birds in suburban districts need about one third of that quantity. Excepting for a few spiders and earthworms the whole of the food was found to consist of injurious insects. It is probably safe to say, also, that during the whole of the nesting period the parent bird feeds upon food similar to that which is fed the nestling.

The following conclusions of Mr. Collinge (*Journ. Bd. Agri.*, 21, 1-6) are of interest: "In spite of all that has been written with reference to the depredations of the house sparrow, we do not yet possess that completeness of knowledge that justifies us in condemning it as

an "avian rat," or bird that should be exterminated. That it is far too plentiful no one doubts, but seeing that practically all modern houses provide numerous and safe nesting places for it this is scarcely surprising.

"It is extremely difficult to arrive at any satisfactory and convincing conclusion as to the precise economic status of this species, but after carefully considering the results obtained from an examination of the stomach contents of 404 adult birds, and of 42 and 287 nestling birds, and also from an examination of the fæces, the writer is of the opinion that if this species were considerably

reduced in numbers, the good that it would do would probably more than compensate for the harm, especially in fruit growing districts.

"Any investigation of the economic status of most species of wild birds is incomplete, and to a large extent misleading, that does not deal with the question of the nature of the food fed to the young bird or nestling, for during the nestling period the food of the parent birds consists largely of insects, slugs, spiders, and worms, and that of the young almost entirely so, and the amount of food consumed is greater than at any other season of the year."

## REPORTS.

## VIOLATIONS OF THE FISH AND GAME LAWS.

December 1, 1914, to February 28, 1915.

Offense	Number of arrests	Fines imposed
<i>Game.</i>		
Hunting without license-----	57	\$870 00
Deer, close season, killing or possession-----	29	675 00
Illegal deer hides-----	1	25 00
Female deer, killing or possession-----	2	100 00
Doves, close season, killing or possession-----	5	125 00
Ducks, close season, killing or possession-----	1	
Ducks, excess bag limit, killing or possession-----	21	260 00
Using live animal blind to shoot ducks-----	3	50 00
Shooting ducks from power boat in motion-----	4	15 00
Night shooting-----	14	300 00
Quail, close season, killing or possession-----	3	100 00
Quail, excess bag limit-----	2	25 00
Quail, sale-----	1	
Quail in possession, trapped without permit-----	1	30 00
Rail, close season, killing or possession-----	1	25 00
Grouse, close season, killing or possession-----	1	25 00
Swan, killing or possession-----	3	75 00
Wild pheasants, killing or possession-----	1	
Non-game birds, killing or possession-----	15	226 80
Total game violations-----	165	\$2,926 80
<i>Fish.</i>		
Angling without license-----	1	\$10 00
Fishing for profit without license-----	5	40 00
Dealing in fish and game wholesale without license-----	5	50 00
Underweight striped bass, possession-----	4	50 00
Dried shrimp and shells in possession-----	1	20 00
Undersized crabs, possession-----	9	25 00
Undersized Pismo clams, possession-----	3	85 00
Illegal nets-----	7	75 00
Steelhead trout, taking or possession, close season-----	7	300 00
Undersized catfish, sale-----	1	
Sacramento perch, sale-----	1	
Young of fish in possession-----	1	20 00
Taking shell fish in Monterey Fish Reservation-----	1	25 00
Abalones, taking or possession, close season-----	4	70 00
Crawfish, oversize, taking or possession-----	1	30 00
Total fish violations-----	51	\$800 00
Grand total, fish and game violations-----	216	\$3,726 80



## SEIZURES—FISH, GAME AND ILLEGALLY USED FISHING APPARATUS.

December 1, 1914, to February 28, 1915.

*Fish.*

Striped bass .....	575 pounds
Salmon .....	176 pounds
Black bass .....	83 pounds
Steelhead trout .....	2,653½ pounds
Catfish .....	60 pounds
Sacramento perch .....	9 pounds
Smelt .....	110 pounds
Crabs .....	152
Clams .....	350
Abalones .....	39
Lobsters (crawfish) .....	53
Nets and lines .....	24

*Game.*

Ducks .....	2,570
Quail .....	122
Doves .....	9
Shore birds .....	1
Swans .....	1
Non-game birds .....	85
Rabbits .....	239
Deer meat .....	330½ pounds

## SEARCHES.

Illegal fish and game .....	56
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## FINANCIAL REPORT.

Statement of Expenditures for the Months of November, December, 1914, and January, 1915.

	November	December	January
<b>GENERAL ADMINISTRATION.</b>			
Commissioners' traveling and other expenses-----	\$40 65	\$12 50	\$33 80
Salaries of administrative assistants-----	975 00	976 50	975 00
Traveling expenses of administrative assistants-----	38 79	100 70	62 10
Rentals, office and other supplies-----	261 20	268 61	270 47
	\$1,315 64	\$1,358 31	\$1,341 37
<b>GENERAL FISH AND GAME PATROL.</b>			
<i>San Francisco Division.</i>			
Salaries of deputies and employees-----	\$2,860 50	\$2,914 00	\$2,946 00
Traveling expenses of deputies and employees-----	1,141 64	935 58	963 46
Rentals, office and other supplies-----	159 91	148 57	215 05
	4,162 05	3,998 15	4,124 51
<i>Sacramento Division.</i>			
Salaries of deputies and employees-----	\$2,613 00	\$2,572 50	\$2,415 00
Traveling expenses of deputies and employees-----	1,131 78	1,124 99	1,154 72
Rentals, office and other supplies-----	131 42	135 65	154 76
	3,876 20	3,833 14	3,724 48
<i>Los Angeles Division.</i>			
Salaries of deputies and employees-----	\$1,137 34	\$985 00	\$985 00
Traveling expenses of deputies and employees-----	419 92	311 26	214 45
Rentals, office and other supplies-----	149 70	148 86	126 33
	1,706 96	1,445 12	1,325 78
<i>Fresno Division.</i>			
Salaries of deputies and employees-----	\$1,270 00	\$1,176 00	\$1,398 00
Traveling expenses of deputies and employees-----	657 72	737 65	907 63
Rentals, office and other supplies-----	88 21	121 94	87 43
	2,015 93	2,035 59	2,393 06
<i>Miscellaneous Expenditures.</i>			
Prosecutions and allowances-----	398 57	476 42	579 67
General printing-----	66 28	107 35	714 51
	\$13,541 63	\$13,254 08	\$14,203 38
Total, general administration and patrol-----			

Probable cost general administration and game patrol (60%)-----	\$8,424 98	\$7,952 448	\$8,522 028
Probable cost general administration and fish patrol (40%)-----	5,416 65	5,301 632	5,681 552
	\$13,541 63	\$13,254 08	\$14,203 38
FISHERY EXPENDITURES.			
<i>Administration.</i>			
Salaries of superintendent of hatcheries and assistants-----			
Traveling expenses, superintendent of hatcheries and assistants	\$340 00	\$340 00	\$340 00
Office and laboratory supplies, etc.-----	115 25	130 65	149 90
	29 57	72 20	33 25
		\$542 85	\$523 15
<i>Fishery Research and Publicity.</i>			
Salaries -----	\$265 00	\$265 00	\$275 00
Traveling expenses -----	148 00	59 30	73 26
Supplies, etc. -----	4 94	7 20	2 15
<i>Screen and Fishway Surveys.</i>			
Salaries -----	\$241 67	\$265 00	\$36 67
Traveling expenses -----	93 10	70 35	20 00
Supplies, etc. -----	4 48	2 18	
<i>Fish Transplanting (pack-train, messengers, etc.).</i>			
Salaries -----	\$6 00	\$65 00	
Traveling expenses -----			
Repairs and supplies -----	9 90		
<i>Fish Distribution (car and messengers).</i>			
Salaries -----	\$207 84		\$21 00
Messenger allowance and traveling expenses -----	108 50		20 45
Repairs -----	21 20	\$8 26	
Supplies -----	84 01	53 26	
<i>Fish Patrol (launches, etc.)</i>			
Salaries -----	\$216 00	\$210 00	\$246 00
Messenger allowance and traveling expenses -----	38 25	39 15	114 21
Repairs -----	81 50		22 00
Supplies (oil, etc.)-----	95 23	76 47	97 82
	430 98	325 62	480 03

## FINANCIAL REPORT—Continued.

## Statement of Expenditures for the Months of November, December, 1914, and January, 1915—Continued.

	November	December	January
<i>Sisson Hatchery.</i>			
Salaries	\$1,824 57	\$1,759 25	\$1,503 50
Traveling expenses	4 75		12 20
Construction and repairs	193 41	185 62	155 08
Fish food and ice for meat	299 41	78 27	144 48
General supplies	34 66	59 64	
	\$2,356 80	\$2,082 78	\$1,815 26
<i>Tahoe and Tallac Hatcheries.</i>			
Salaries	\$10 00	\$10 00	\$10 00
Traveling expenses			
Construction and repairs			
Supplies			
	10 00	10 00	10 00
<i>Pine Creek Hatchery.</i>			
Salaries	\$180 00	\$125 00	\$222 50
Traveling expenses	1 00	3 75	21 85
Construction and repairs		17 34	
Supplies	13 90	14 15	62 30
	194 90	160 24	\$306 65
<i>Utah Hatchery and Snow Mountain.</i>			
Salaries	\$178 25	\$172 50	\$93 00
Traveling expenses	14 46		
Construction and repairs	248 07	204 86	
Supplies		53 75	2 75
	540 78	431 11	95 75
<i>Klamath Spawning Station.</i>			
Salaries			\$125 00
Traveling expenses			31 30
Construction and repairs			
Supplies			20 00
			176 30

*Miscellaneous Expenditures.*

Printing and lithographing fishing licenses, notices, application blanks, etc.	506 83	
Angler's license, commissions and refunds.	501 90	1,483 50
Market fishing license commissions.	9 25	9 75
Crawfish inspection	10 00	10 00
Total fishery expenditures.	\$6,240 90	\$5,851 40
		\$4,659 63

### GAME EXPENDITURES.

*Hayward Game Farm.*

Salaries	\$203 50	\$208 00	\$200 00
Traveling expenses	31 85	9 05	70
Rent			112 50
Construction and repairs	33 63		157 10
Feed for birds	55 74	46 05	53 45
General supplies	74 91	43 27	43 72
		\$399 63	\$306 37
			\$567 47

### Game Research and Publicity.

Salaries	\$107 85	\$219 90	\$624 22
Traveling expenses	77 85	1 40	53 15
Supplies, etc.	24 88	39 88	595 40
		270 58	261 18
			1,272 77

*Miscellaneous Expenditures.*

Printing and lithographing of hunting licenses, notices, application blanks, etc.	1,330 90	1,513 20	1,652 30
Hunting license commissions and refunds	500 00	440 00	460 00
Mountain lion bounties			
Total game expenditures	\$2,501 11	\$2,520 75	\$3,952 54
Grand total of all expenditures	\$22,283 64	\$21,626 23	\$22,815 55
Total of fish expenditures	\$11,657 55	\$11,153 032	\$10,340 982
Total of game expenditures	10,626 09	10,473 198	12,474 568
Grand total	\$22,283 64	\$21,626 23	\$22,815 55













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